

HANDBOOK

8310.6

Consolidated reprint:
Includes **Change-1**
1/4/85

AIRWORTHINESS COMPLIANCE CHECK SHEET HANDBOOK



April **10, 1969**

-DEPARTMENT OF TRANSPORTATION
FEDERAL AVIATION ADMINISTRATION

Distribution: **FFS-1, 2, 3, & 5** (all employees);
FIA-0 (Standard); **FS 8310**

initiated By: FS-340

8310.6

FAA-Form-1320-5 (5-6-8) SUPERSEDES PREVIOUS EDITION

8310.6

FAA-Form-1320-5 (5-68) SUPERSEDES PREVIOUS EDITION

8310.6

FAA-Form-1320-5 (5-68) SUPERSEDES PREVIOUS EDITION

8310.6

FAA Form 1320-5 (5-68) SUPERSEDES PREVIOUS EDITION

TABLE OF CONTENTS

<u>ACCS NO.</u>		<u>PAGE</u>
CHAPTER 2. AIRFRAME		
15.	Landing Light Installations - FAR 23 aircraft.	49
16.	Landing Light Installations - FAR 25 aircraft.	53
17.	Interior Light Installations - FAR 23 aircraft.	57
18.	Interior Light Installations - FAR 25 aircraft.	59
19.	Anticollision Light Installations - FAR 25 aircraft.	61
20.	Buffet and Cabinet Installations - FAR 23 aircraft.	65
21.	Buffet and Cabinet Installations - FAR 25 aircraft.	69
22.	Installations or Modifications of Windshields With or Without Electrical Heating Provisions in Nonpressurized FAR 23 aircraft.	73
23.	Modification of an Exhaust Type Cabin Heater to Increase Heat Output Without any Changes to The Existing Exhaust System - FAR 23 aircraft.	77
CHAPTER 3. RADIO & ELECTRICAL		
24.	Buffet Installation (Electrical Portion) - FAR 23 aircraft.	81
25.	Buffet Installation (Electrical Portion) - FAR 25 aircraft.	83
26.	Radio Racks and Radio Equipment Installations - FAR 25 aircraft.	85
27.	Radio Antenna Installation - FAR 25 aircraft.	89
28.	Appliance Outlet Installation - FAR 25 aircraft	91

TABLE OF CONTENTS

<u>ACCS NO.</u>	<u>PAGE</u>
CHAPTER 4. INSTRUMENTS	
29. Instrument Installations - Relocating Instruments, FAR 23 aircraft.	93
30. Instrument Installations, Adding Instruments, FAR 23 aircraft.	97
31. Instrument Installations, Relocating Instruments, FAR 25 aircraft.	99
32. Instrument Installations, Adding Instruments, FAR 25 aircraft.	103
33. Gyroscopic Instruments - FAR 23 aircraft.	105
34. Gyroscopic Instruments - FAR 25 aircraft.	107

TABLE OF CONTENTS

<u>ACCS NO.</u>	<u>PAGE</u>
CHAPTER 4. INSTRUMENTS	
29. Instrument Installations - Relocating Instruments, FAR 23 aircraft.	93
30. Instrument Installations, Adding Instruments, FAR 23 aircraft.	97
31. Instrument Installations, Relocating Instruments, FAR 25 aircraft.	99
32. Instrument Installations, Adding Instruments, FAR 25 aircraft.	103
33. Gyroscopic Instruments - FAR 23 aircraft.	105
34. Gyroscopic Instruments - FAR 25 aircraft.	107

TABLE OF CONTENTS

<u>ACCS NO.</u>	<u>PAGE</u>
CHAPTER 4. INSTRUMENTS	
29. Instrument Installations - Relocating Instruments, FAR 23 aircraft.	93
30. Instrument Installations, Adding Instruments, FAR 23 aircraft.	97
31. Instrument Installations, Relocating Instruments, FAR 25 aircraft.	99
32. Instrument Installations, Adding Instruments, FAR 25 aircraft.	103
33. Gyroscopic Instruments - FAR 23 aircraft.	105
34. Gyroscopic Instruments - FAR 25 aircraft.	107

TABLE OF CONTENTS

<u>ACCS NO.</u>	<u>PAGE</u>
CHAPTER 4. INSTRUMENTS	
29. Instrument Installations - Relocating Instruments, FAR 23 aircraft.	93
30. Instrument Installations, Adding Instruments, FAR 23 aircraft.	97
31. Instrument Installations, Relocating Instruments, FAR 25 aircraft.	99
32. Instrument Installations, Adding Instruments, FAR 25 aircraft.	103
33. Gyroscopic Instruments - FAR 23 aircraft.	105
34. Gyroscopic Instruments - FAR 25 aircraft.	107

d. Detail Design Standards:

- (1) Is the generator installed so as to permit inspection of the condition of the brushes and wiring terminals without removal of adjacent equipment? (FAR **23.611.**)
- (2) **Is** the generator installed so as to be protected from fuel, oil, water, and other detrimental substances and mechanical damage? (FAR **23.1351.**)

d. Detail Design Standards:

- (1) Is the generator installed so as to permit inspection of the condition of the brushes and wiring terminals without removal of adjacent equipment? (FAR 23.611.)
- (2) Is the generator installed so as to be protected from fuel, oil, water, and other detrimental substances and mechanical damage? (FAR 23.1351.)

d. Detail Design Standards:

- (1) Is the generator installed so as to permit inspection of the condition of the brushes and wiring terminals without removal of adjacent equipment? (FAR 23.611.)
- (2) Is the generator installed so as to be protected from fuel, oil, water, and other detrimental substances and mechanical damage? (FAR 23.1351.)

d. Detail Design Standards:

- (1) Is the generator installed so as to permit inspection of the condition of the brushes and wiring terminals without removal of adjacent equipment? (FAR 23.611.)
- (2) Is the generator installed so as to be protected from fuel, oil, water, and other detrimental substances and mechanical damage? (FAR 23.1351.)

d. Detail Design Standards:

- (1) Is the generator installed so as to permit inspection of the condition of the brushes and wiring terminals without removal of adjacent equipment? (FAR 23.611.)
- (2) Is the generator installed so as to be protected from fuel, oil, water, and other detrimental substances and mechanical damage? (FAR 23.1351.)

d. Detail Design Standards:

- (1) Is the generator installed so as to permit inspection of the condition of the brushes and wiring terminals without removal of adjacent equipment? (FAR 23.611.)
- (2) Is the generator installed so as to be protected from fuel, oil, water, and other detrimental substances and mechanical damage? (FAR 23.1351.)

AIRWORTHINESS COMPLIANCE CHECK SHEET #3

1. SUBJECT: Wind-Driven Generator Installations - FAR 23 Aircraft

2. APPLICABLE FEDERAL AVIATION REGULATIONS

23.611 Inspection Provisions
 23.1351 Electrical System Installation
 23.1361 Master Switch Arrangement
 23.301 Strength Requirements, General
 .303
 .305
 .307
 23.321 Flight Loads
 23.471 Ground Loads
 23.601 Design and Construction, General
 .603
 .605
 .607
 .609
 .611
 23.629 Flutter and Vibration Prevention
 91.167 Test Flight Passenger Provisions

3. CHECKLIST

a. Structural Requirements

(1) Is the installation satisfactory for the required loads?
 (FAR 23.301, .303, .305, .307, .321, .471)

Note: Wind-driven generators can be installed preferably by attachment to fuselage structural members. Engine mount or landing gear ~~attach~~ fittings are usually utilized. though unit ~~supporting~~ structure (~~bracketry~~) has successfully been extended from other structural strong points. ~~MOUNTING ON WING-LIFT STRUTS SHOULD BE AVOIDED, INSTALLATIONS OF THIS TYPE HAVE CAUSED STRUT FAILURES RESULTING FROM FATIGUE BROUGHT ON BY VIBRATION CHARACTERISTICS.~~ To maintain structural integrity, the installation should be adequate to withstand the required loads. In lieu of a calculated value of these loads, the following ultimate values in ~~lbs~~ may be used.

<u>Normal and Utility</u>		<u>Acrobatic</u>
Fwd	1.65	2.25
up	3.0	4.5
Side	1.5	1.5
Down	6.6	9.0

AIRWORTHINESS COMPLIANCE CHECK SHEET #3

1. SUBJECT: Wind-Driven Generator Installations - FAR 23 Aircraft

2. APPLICABLE FEDERAL AVIATION REGULATIONS

23.611 Inspection Provisions
 23.1351 Electrical System Installation
 23.1361 Master Switch Arrangement
 23.301 Strength Requirements, General
 .303
 .305
 .307
 23.321 Flight Loads
 23.471 Ground Loads
 23.601 Design and Construction, General
 .603
 .605
 .607
 .609
 .611
 23.629 Flutter and Vibration Prevention
 91.167 Test Flight Passenger Provisions

3. CHECKLIST

a. Structural Requirements

(1) Is the installation satisfactory for the required loads?
 (FAR 23.301, .303, .305, .307, .321, .471)

Note: Wind-driven generators can be installed preferably by attachment to fuselage structural members. Engine mount or landing gear attach fittings are usually utilized. though unit supporting structure ((bracketry)) has successfully been extended from other structural strong points. ~~MOUNTING ON WING-LIFT STRUTS SHOULD BE AVOIDED, INSTALLATIONS OF THIS TYPE HAVE CAUSED STRUT FAILURES RESULTING FROM FATIGUE BROUGHT ON BY VIBRATION CHARACTERISTICS.~~ To maintain structural integrity, the installation should be adequate to withstand the required loads. In lieu of a calculated value of these loads, the following ultimate values in ~~lbs~~ may be used.

<u>Normal and Utility</u>		<u>Acrobatic</u>
Fwd	1.65	2.25
up	3.0	4.5
Side	1.5	1.5
Down	6.6	9.0

AIRWORTHINESS COMPLIANCE CHECK SHEET #3

1. SUBJECT: Wind-Driven Generator Installations - FAR 23 Aircraft

2. APPLICABLE FEDERAL AVIATION REGULATIONS

23.611 Inspection Provisions
 23.1351 Electrical System Installation
 23.1361 Master Switch Arrangement
 23.301 Strength Requirements, General
 .303
 .305
 .307
 23.321 Flight Loads
 23.471 Ground Loads
 23.601 Design and Construction, General
 .603
 .605
 .607
 .609
 .611
 23.629 Flutter and Vibration Prevention
 91.167 Test Flight Passenger Provisions

3. CHECKLIST

a. Structural Requirements

(1) Is the installation satisfactory for the required loads?
 (FAR 23.301, .303, .305, .307, .321, .471)

Note: Wind-driven generators can be installed preferably by attachment to fuselage structural members. Engine mount or landing gear ~~attach~~ fittings are usually utilized. though unit supporting structure (~~bracketry~~) has successfully been extended from other structural strong points. ~~MOUNTING ON WING-LIFT STRUTS SHOULD BE AVOIDED, INSTALLATIONS OF THIS TYPE HAVE CAUSED STRUT FAILURES RESULTING FROM FATIGUE BROUGHT ON BY VIBRATION CHARACTERISTICS.~~ To maintain structural integrity, the installation should be adequate to withstand the required loads. In lieu of a calculated value of these loads, the following ultimate values in ~~lbs~~ may be used.

<u>Normal and Utility</u>		<u>Acrobatic</u>
Fwd	1.65	2.25
up	3.0	4.5
Side	1.5	1.5
Down	6.6	9.0

AIRWORTHINESS COMPLIANCE CHECK SHEET #3

1. SUBJECT: Wind-Driven Generator Installations - FAR 23 Aircraft

2. APPLICABLE FEDERAL AVIATION REGULATIONS

23.611 Inspection Provisions
 23.1351 Electrical System Installation
 23.1361 Master Switch Arrangement
 23.301 Strength Requirements, General
 .303
 .305
 .307
 23.321 Flight Loads
 23.471 Ground Loads
 23.601 Design and Construction, General
 .603
 .605
 .607
 .609
 .611
 23.629 Flutter and Vibration Prevention
 91.167 Test Flight Passenger Provisions

3. CHECKLIST

a. Structural Requirements

(1) Is the installation satisfactory for the required loads?
 (FAR 23.301, .303, .305, .307, .321, .471)

Note: Wind-driven generators can be installed preferably by attachment to fuselage structural members. Engine mount or landing gear attach fittings are usually utilized. though unit supporting structure ((bracketry)) has successfully been extended from other structural strong points. MOUNTING ON WING-LIFT STRUTS SHOULD BE AVOIDED, INSTALLATIONS OF THIS TYPE HAVE CAUSED STRUT FAILURES RESULTING FROM FATIGUE BROUGHT ON BY VIBRATION CHARACTERISTICS. To maintain structural integrity, the installation should be adequate to withstand the required loads. In lieu of a calculated value of these loads, the following ultimate values in lbs may be used.

<u>Normal and Utility</u>		<u>Acrobatic</u>
Fwd	1.65	2.25
up	3.0	4.5
Side	1.5	1.5
Down	6.6	9.0

AIRWORTHINESS COMPLIANCE CHECK SHEET #4

1. SUBJECT. Motor and **Dynamotor** Installations - FAR 25 Aircraft.
2. APPLICABLE FEDERAL AVIATION REGULATIONS.

21.305 Approval of Materials, Parts, Processes and Appliances
25.301 Loads
25.303 Loads
25.305 Strength and Deformation
25.307 Proof of Structure
25.321 Flight Loads
25.365 Flight Loads
25.367 Flight Loads
25.471 Ground Loads
25.473 Ground Loads
25.489 Ground Loads
25.491 Ground Loads
25.499 Ground Loads
25.503 Ground Loads
25.507 Ground Loads
25.511 Ground Loads
25.561 Emergency Landing Conditions
25.603 Materials
25.605 Fabrication Methods
25.607 Standard Fastenings
25.609 Protection
25.611 Inspection Provisions
25.615 Material Strength Properties and Design Values
25.863 Flammable Fluid Fire Protection
25.1309 Equipment, Systems, and Installations
25.1357 Electrical Protection
25.1353 Electrical Equipment and Installations
25.1359 Electrical System Fire and Smoke Protection

Motor or **dynamotor** installations which are the same as those made by the airframe manufacturer, or other installations which are already approved, **may be** accepted without further investigation. On other installations the following points should be checked to determine that the installation is satisfactory.

3. CHECKLIST.

a. Structural Requirements.

- (1) Is the equipment installed in such a manner that the installation can withstand the required loads? The effect on other structure (primary or secondary) should be considered. (~~FARs~~ 25.301, 25.303, 25.305, 25.307, 25.321, 25.365, 25.367, 25.373, 25.471, 25.473, 25.489, 25.491, 25.499, 25.503, 25.507, 25.511).

NOTE: This **answer** ~~can~~ be determined by a direct comparison with an existing approved installation having the same or similar (approximately same weight and size) equipment installed, by structural analysis, or by static test.

Such installations do not necessarily lend themselves to analysis but are adaptable to static test. In conducting this test, the following procedure may be used:

- (a) Determine the weight and **c.g.** of the equipment.
- (b) Mount the equipment in the position in the airplane or simulate the equipment with a dummy so that the required loads can be applied at the **c.g.** position of the actual equipment.
- (c) ~~The~~ required loads should then be applied by any **suitable** means. **If** the equipment is light in weight, the inspector could use his own strength and/or weight to ~~determine~~ that the installation will withstand the required **loads**.

All items of mass which would be apt to injure the passengers or crew in the event of a crash landing should have their supporting structure designed to the crash load requirements or the applicable critical flight or landing load factors of FAR 25.301, 25.303 or 25.471, 25.473, 25.489, 25.491, 25.499, 25.503, 25.507, 25.511, whichever is greater.

Supporting structure of other mass items should be designated to the critical flight or landing load factors of FAR 25.301, 25.303 or 25.471, 25.473, 25.489, 25.491, 25.499, 25.503, 25.507, 25.511. The values shown in FAR 25.561 may be used in lieu of a determination of these values.

- (2) Are suitable materials used in the construction, including ~~standard~~ fasteners, and will the method of fabrication result in a consistently sound structure? (FARs 25.603, 25.605, 25.607, 25.615, 21.305)
- (3) Are means provided to permit proper inspections of the installation and related or adjacent parts and components? (FAR 25.611)

b. Hazards to the Aircraft and its Occupants

- (1) Is a fuse or circuit breaker of the appropriate rating installed in the connecting **cables**? (FAR 25.1357)

NOTE: This answer-can be determined by a direct comparison with an existing approved installation having the same or similar (approximately same weight and size) equipment installed, by structural analysis, or by static test.

Such installations do not necessarily lend themselves to analysis but are adaptable to static test. In conducting this test, the following procedure may be used:

- (a) Determine the weight and **c.g.** of the equipment.
- (b) Mount ~~the~~ equipment in the position in the airplane or simulate the equipment with a dummy so that the required loads can be applied at the **c.g.** position of the actual equipment.
- (c) ~~The~~ required loads should then be applied by any ~~suitable~~ means. **If** the equipment is light in weight, the inspector could **use** his own strength and/or weight to ~~determine~~ that the installation will withstand the required **loads**.

All items of **mass** which would be apt to injure the passengers or crew in the event of a crash landing should have their supporting structure designed to the crash load requirements or the applicable critical flight or landing load factors of FAR **25.301, 25.303 or 25.471, 25.473, 25.489, 25.491, 25.499, 25.503, 25.507, 25.511,** whichever is greater.

Supporting structure of other mass items should be designated to the critical flight or landing load factors of FAR **25.301, 25.303 or 25.471, 25.473, 25.489, 25.491, 25.499, 25.503, 25.507, 25.511.** The values shown in FAR **25.561** may be **used** in **lieu** of a determination of these values.

- (2) Are suitable materials used in the construction, including ~~standard~~ fasteners, and will the method of fabrication result in a consistently sound structure? (**FARs 25.603, 25.605, 25.607, 25.615, 21.305**)
- (3) Are means provided to permit proper inspections of the installation and related or adjacent parts and components? (**FAR 25.611**)

b. Hazards to the Aircraft and its Occupants

- (1) Is a fuse or circuit breaker of the appropriate rating installed in the connecting **cables**? (**FAR 25.1357**)

NOTE: This answer-can be determined by a direct comparison with an existing approved installation having the same or similar (approximately same weight and size) equipment installed, by structural analysis, or by static test.

Such installations do not necessarily lend themselves to analysis but are adaptable to static test. In conducting this test, the following procedure may be used:

- (a) Determine the weight and **c.g.** of the equipment.
- (b) Mount ~~the~~ equipment in the position in the airplane or simulate the equipment with a dummy so that the required loads can be applied at the **c.g.** position of the actual equipment.
- (c) ~~The~~ required loads should then be applied by any ~~suitable~~ means. **If the** equipment is light in weight, the inspector could use his own strength and/or weight to ~~determine~~ that the installation will withstand the required **loads**.

All items of **mass** which would be apt to injure the passengers or crew in the event of a crash landing should have their supporting structure designed to the crash load requirements or the applicable critical flight or landing load factors of FAR 25.301, 25.303 or 25.471, 25.473, 25.489, 25.491, 25.499, 25.503, 25.507, 25.511, whichever is greater.

Supporting structure of **other** mass items should be designated to the critical flight or landing load factors of FAR 25.301, 25.303 or 25.471, 25.473, 25.489, 25.491, 25.499, 25.503, 25.507, 25.511. The values shown in FAR 25.561 may be used in **lieu** of a determination of these values.

- (2) Are suitable materials used in the construction, including ~~standard~~ fasteners, and will the method of fabrication result in a consistently sound structure? (FARs 25.603, 25.605, 25.607, 25.615, 21.305)
- (3) Are means provided to permit proper inspections of the installation and related or adjacent parts and components? (FAR 25.611)

b. Hazards to the Aircraft and its Occupants

- (1) Is a fuse or circuit breaker of the appropriate rating installed in the connecting **cables**? (FAR 25.1357)

NOTE: This answer can be determined by a direct comparison with an existing approved installation having the same or similar (approximately same weight and size) equipment installed, by structural analysis, or by static test.

Such installations do not necessarily lend themselves to analysis but are adaptable to static test. In conducting this test, the following procedure may be used:

- (a) Determine the weight and **c.g.** of the equipment.
- (b) Mount the equipment in the position in the airplane or simulate the equipment with a dummy so that the required loads can be applied at the **c.g.** position of the actual equipment.
- (c) The required loads should then be applied by any **suitable** means. If the equipment is light in weight, the inspector could use his own strength and/or weight to **determine** that the installation will withstand the required loads.

All items of **mass** which would be apt to injure the passengers or crew in the event of a crash landing should have their supporting structure designed to the crash load requirements or the applicable critical flight or landing load factors of FAR 25.301, 25.303 or 25.471, 25.473, 25.489, 25.491, 25.499, 25.503, 25.507, 25.511, whichever is greater.

Supporting structure of **other** mass items should be designated to the critical flight or landing load factors of FAR 25.301, 25.303 or 25.471, 25.473, 25.489, 25.491, 25.499, 25.503, 25.507, 25.511. The values shown in FAR 25.561 may be used in lieu of a determination of these values.

- (2) Are suitable materials used in the construction, including **standard** fasteners, and will the method of fabrication result in a consistently sound structure? (FARs 25.603, 25.605, 25.607, 25.615, 21.305)
- (3) Are means provided to permit proper inspections of the installation and related or adjacent parts and components? (FAR 25.611)

b. Hazards to the Aircraft and its Occupants

- (1) Is a fuse or circuit breaker of the appropriate rating installed in the connecting **cables**? (FAR 25.1357)

NOTE: This answer can be determined by a direct comparison with an existing approved installation having the same or similar (approximately same weight and size) equipment installed, by structural analysis, or by static test.

Such installations do not necessarily lend themselves to analysis but are adaptable to static test. In conducting this test, the following procedure may be used:

- (a) Determine the weight and **c.g.** of the equipment.
- (b) Mount the equipment in the position in the airplane or simulate the equipment with a dummy so that the required loads can be applied at the **c.g.** position of the actual equipment.
- (c) The required loads should then be applied by any suitable means. **If** the equipment is light in weight, the inspector could use his own strength and/or weight to ~~determine~~ **determine** that the installation will withstand the required loads.

All items of **mass** which would be apt to injure the passengers or crew in the event of a crash landing should have their supporting structure designed to the crash load requirements or the applicable critical flight or landing load factors of FAR 25.301, 25.303 or 25.471, 25.473, 25.489, 25.491, 25.499, 25.503, 25.507, 25.511, whichever is greater.

Supporting structure of other mass items should be designated to the critical flight or landing load factors of FAR 25.301, 25.303 or 25.471, 25.473, 25.489, 25.491, 25.499, 25.503, 25.507, 25.511. The values shown in FAR 25.561 may be used in lieu of a determination of these values.

- (2) Are suitable materials used in the construction, including ~~standard~~ fasteners, and will the method of fabrication result in a consistently sound structure? (FARs 25.603, 25.605, 25.607, 25.615, 21.305)
- (3) Are means provided to permit proper inspections of the installation and related or adjacent parts and components? (FAR 25.611)

b. Hazards to the Aircraft and its Occupants

- (1) Is a fuse or circuit breaker of the appropriate rating installed in the connecting **cables**? (FAR 25.1357)

AIRWORTHINESS COMPLIANCE CHECK SHEET #6

1. SUBJECT: Modification of an Airplane to Replace the Engine Exhaust System With One of New Design - FAR 23 Aircraft

2. APPLICABLE FEDERAL AVIATION REGULATIONS

23.1121 Exhaust System - General

23.1123 Exhaust Manifold

The primary function of the exhaust manifold is to conduct exhaust ~~gases~~ overboard with minimum hazard to the airplane and pilot. The system must be reliable, exert a minimum back pressure, be accessible for inspection and not interfere with engine-cooling airflow. The material must be particularly suitable for operation under high temperature and corrosive effects of the ~~gas, and~~ the weight should be held to a minimum consistent with the ~~needs~~ of the system.

3. CHECKLIST

a. Structural Requirements:

(1) For any change or alteration of the airplane structure, have the original strength and integrity of the structure been retained? (AC 43.13-2 Chapter 1)

NOTE: If the specific alteration cannot be evaluated using AC 43.13 or equivalent reference, it should be referred to the Engineering Service Representative.

(2) Is the exhaust manifold properly supported and attached to the engine so that vibration and any other loads imposed during normal operation will not affect the service life of the manifold? (FAR 23.1123.)

NOTE : Brackets supporting the manifold should be properly attached to the engine. Attachment to any highly stressed components, such as cylinder hold-down studs, crankcase studs, and through bolts should be avoided.

b. Hazards to the Aircraft or its Occupants:

(1) Are any of the exhaust system components located near any systems carrying flammable fluids or vapors? (FAR 23.1121.)

(2) Where exhaust system components are unavoidably located near systems carrying flammable fluids or vapors, have suitable precautions been taken to preclude a fire hazard? (FAR 23.1121.)

AIRWORTHINESS COMPLIANCE CHECK SHEET #6

1. SUBJECT: Modification of an ~~Airplane~~ to ~~Replace~~ the ~~Engine~~ Exhaust System With One of New Design - FAR 23 Aircraft

2. APPLICABLE FEDERAL AVIATION REGULATIONS

~~23.1121~~ Exhaust System - General

~~23.1123~~ Exhaust Manifold

The primary function of the exhaust manifold is to conduct exhaust gas & overboard with minimum hazard to the airplane and pilot. The system must be reliable, exert a minimum back pressure, be accessible for inspection and not interfere with engine-cooling airflow. The material must be particularly suitable for operation under high temperature and corrosive effects of the ~~gas, and~~ the weight should be held to a minimum consistent with the ~~needs~~ of the system.

3. CHECKLIST

a. Structural Requirements:

(1) For any change or alteration of the airplane structure, have the original strength and integrity of the structure been retained? (AC ~~43.13-2~~ Chapter 1)

NOTE: ~~If~~ the specific alteration cannot be evaluated using AC ~~43.13~~ or equivalent reference, it should be referred to the Engineering Service Representative.

(2) ~~Is~~ the exhaust manifold properly supported and attached to the engine so that vibration and any other loads imposed during normal operation will not affect the service life of the manifold? (FAR ~~23.1123~~.)

NOTE : Brackets supporting the manifold should be properly attached to the engine. Attachment to any highly stressed components, such as cylinder hold-down studs, crankcase studs, and through bolts should be avoided.

b. Hazards to the Aircraft or its Occupants:

(1) Are any of the exhaust system components located near any systems carrying flammable fluids or vapors? (FAR ~~23.1121~~.)

(2) Where exhaust system components are unavoidably located near systems carrying flammable fluids or vapors, have suitable precautions been taken to preclude a fire hazard? (FAR ~~23.1121~~.)

AIRWORTHINESS COMPLIANCE CHECK SHEET #6

1. SUBJECT: Modification of an ~~Airplane~~ to Replace the ~~Engine~~ Exhaust System With One of New Design - FAR 23 Aircraft

2. APPLICABLE FEDERAL AVIATION REGULATIONS

23.1121 Exhaust System - General

23.1123 Exhaust Manifold

The primary function of the exhaust manifold is to conduct exhaust gas & overboard with minimum hazard to the airplane and pilot. The system must be reliable, exert a minimum back pressure, be accessible for inspection and not interfere with engine-cooling airflow. The material must be particularly suitable for operation under high temperature and corrosive effects of the ~~gas, and~~ the weight should be held to a minimum consistent with the ~~needs~~ of the system.

3. CHECKLIST

a. Structural Requirements:

(1) For any change or alteration of the airplane structure, have the original strength and integrity of the structure been retained? (AC 43.13-2 Chapter 1)

NOTE: ~~If~~ the specific alteration cannot be evaluated using AC ~~43.13~~ or equivalent reference, it should be referred to the Engineering Service Representative.

(2) ~~Is~~ the exhaust manifold properly supported and attached to the engine so that vibration and any other loads imposed during normal operation will not affect the service life of the manifold? (FAR 23.1123.)

NOTE : Brackets supporting the manifold should be properly attached to the engine. Attachment to any highly stressed components, such as cylinder hold-down studs, crankcase studs, and through bolts should be avoided.

b. Hazards to the Aircraft or its Occupants:

(1) Are any of the exhaust system components located near any systems carrying flammable fluids or vapors? (FAR 23.1121.)

(2) Where exhaust system components are unavoidably located near systems carrying flammable fluids or vapors, have suitable precautions been taken to preclude a fire hazard? (FAR 23.1121.)

AIRWORTHINESS COMPLIANCE CHECK SHEET #6

1. SUBJECT: Modification of an ~~Airplane~~ to Replace the Engine Exhaust System With One of New Design - FAR 23 Aircraft

2. APPLICABLE FEDERAL AVIATION REGULATIONS

~~23.1121~~ Exhaust System - General

23.1123 Exhaust Manifold

The primary function of the exhaust manifold is to conduct exhaust gas & overboard with minimum hazard to the airplane and pilot. The system must be reliable, exert a minimum back pressure, be accessible for inspection and not interfere with engine-cooling airflow. The material must be particularly suitable for operation under high temperature and corrosive effects of the ~~gas, and~~ the weight should be held to a minimum consistent with the ~~needs~~ of the system.

3. CHECKLIST

a. Structural Requirements:

(1) For any change or alteration of the airplane structure, have the original strength and integrity of the structure been retained? (AC ~~43.13-2~~ Chapter 1)

NOTE: ~~If~~ the specific alteration cannot be evaluated using AC ~~43.13~~ or equivalent reference, it should be referred to the Engineering Service Representative.

(2) Is the exhaust manifold properly supported and attached to the engine so that vibration and any other loads imposed during normal operation will not affect the service life of the manifold? (FAR ~~23.1123.~~)

NOTE: Brackets supporting the manifold should be properly attached to the engine. Attachment to any highly stressed components, such as cylinder hold-down studs, crankcase studs, and through bolts should be avoided.

b. Hazards to the Aircraft or its Occupants:

(1) Are any of the exhaust system components located near any systems carrying flammable fluids or vapors? (FAR ~~23.1121.~~)

(2) Where exhaust system components are unavoidably located near systems carrying flammable fluids or vapors, have suitable precautions been taken to preclude a fire hazard? (FAR ~~23.1121.~~)

AIRWORTHINESS COMPLIANCE CHECK SHEET #6

1. SUBJECT: Modification of an ~~Airplane~~ to Replace the Engine Exhaust System With One of New Design - FAR 23 Aircraft

2. APPLICABLE FEDERAL AVIATION REGULATIONS

23.1121 Exhaust System - General

23.1123 Exhaust Manifold

The primary function of the exhaust manifold is to conduct exhaust gas & overboard with minimum hazard to the airplane and pilot. The system must be reliable, exert a minimum back pressure, be accessible for inspection and not interfere with engine-cooling airflow. The material must be particularly suitable for operation under high temperature and corrosive effects of the ~~gas, and~~ the weight should be held to a minimum consistent with the ~~needs~~ of the system.

3. CHECKLIST

a. Structural Requirements:

(1) For any change or alteration of the airplane structure, have the original strength and integrity of the structure been retained? (AC 43.13-2 Chapter 1)

NOTE: If the specific alteration cannot be evaluated using AC 43.13 or equivalent reference, it should be referred to the Engineering Service Representative.

(2) Is the exhaust manifold properly supported and attached to the engine so that vibration and any other loads imposed during normal operation will not affect the service life of the manifold? (FAR 23.1123.)

NOTE: Brackets supporting the manifold should be properly attached to the engine. Attachment to any highly stressed components, such as cylinder hold-down studs, crankcase studs, and through bolts should be avoided.

b. Hazards to the Aircraft or its Occupants:

(1) Are any of the exhaust system components located near any systems carrying flammable fluids or vapors? (FAR 23.1121.)

(2) Where exhaust system components are unavoidably located near systems carrying flammable fluids or vapors, have suitable precautions been taken to preclude a fire hazard? (FAR 23.1121.)

- (3) Is the starter motor installed so as to minimize contact with inflammables from fluid or ~~vapor~~ **lines** in the event of arcing or sparking of the motor?

c. Operational:

- (1) Does the starter dog properly mesh and fully engage the engine ~~dog~~, when the meshing cable or solenoid is actuated?
(FAR 23.1163)
- (2) Is there adequate clearance between the starter and engine dogs in the fully retracted position, to prevent riding of the dogs?
(Refer to manufacturer's instruction manual for clearance.)
(FAR 23.1163)

d. Detail Design:

- (1) Is the starter of a type that is acceptable under one of the following means?
- (a) Qualification under an AN or **MIL** specification.
 - (b) Completing a qualification test approved by FAA.
 - (c) Prior satisfactory **service** record on another approved installation.
- (FAR 23.1163)
- (2) Will the starter dog turn in the direction of rotation required by the engine dog? (FAR 23.1163)
- (3) Is the speed ratio of the starter accessory drive correct as recorded in the engine specification? (FAR 23.1163)
- (4) **Is** the maximum static torque delivered by the starter less than that specified in the engine specification? (FAR 23.1163)
- (5) Is the starter overload prevention mechanism satisfactory to permit engaging and disengaging in order to deliver sufficient but not excessive cranking torque to motor the engine?
(FAR 23.1163)
- (6) Is the starter clearance envelope satisfactory with respect to interference, accessibility, inspection, maintenance, removal, and electrical connections to be made? (FAR 23.901)
- (7) **Is** the starter motor suitably protected from fuel, oil, water, and other detrimental conditions? (FAR 23.1351)

- (3) Is the starter motor installed so as to minimize contact with inflammables from fluid or vapor lines in the event of arcing or sparking of the motor?

c. Operational:

- (1) Does the starter dog properly mesh and fully engage the engine ~~dog~~, when the meshing cable or solenoid is actuated?
(FAR 23.1163)
- (2) Is there adequate clearance between the starter and engine dogs in the fully retracted position, to prevent riding of the dogs? (Refer to manufacturer's instruction manual for clearance.)
(FAR 23.1163)

d. Detail Design:

- (1) Is the starter of a type that is acceptable under one of the following means?
- (a) Qualification under an AN or MIL specification.
 - (b) Completing a qualification test approved by FAA.
 - (c) Prior satisfactory **service** record on another approved installation.
- (FAR 23.1163)
- (2) Will the starter dog turn in the direction of rotation required by the engine dog? (FAR 23.1163)
- (3) Is the speed ratio of the starter accessory drive correct as recorded in the engine specification? (FAR 23.1163)
- (4) Is the maximum static torque delivered by the starter less than that specified in the engine specification? (FAR 23.1163)
- (5) Is the starter overload prevention mechanism satisfactory to permit engaging and disengaging in order to deliver sufficient but not excessive cranking torque to motor the engine?
(FAR 23.1163)
- (6) Is the starter clearance envelope satisfactory with respect to interference, accessibility, inspection, maintenance, removal, and electrical connections to be made? (FAR 23.901)
- (7) Is the starter motor suitably protected from fuel, oil, water, and other detrimental conditions? (FAR 23.1351)

- (3) Is the starter motor installed so as to minimize contact with inflammables from fluid or **vapor lines** in the event of arcing or sparking of the motor?

c. Operational:

- (1) Does the starter dog properly mesh and fully engage the engine ~~dog~~, when the meshing cable or solenoid is actuated?
(FAR 23.1163)
- (2) Is there adequate clearance between the starter and engine dogs in the fully retracted position, to prevent riding of the dogs?
(Refer to manufacturer's instruction manual for clearance.)
(FAR 23.1163)

d. Detail Design:

- (1) Is the starter of a type that is acceptable under one of the following means?
- (a) Qualification under an AN or **MIL** specification.
 - (b) Completing a qualification test approved by FAA.
 - (c) Prior satisfactory **service** record on another approved installation.
- (FAR 23.1163)
- (2) Will the starter dog turn in the direction of rotation required by the engine dog? (FAR 23.1163)
- (3) Is the speed ratio of the starter accessory drive correct as recorded in the engine specification? (FAR 23.1163)
- (4) **Is** the maximum static torque delivered by the starter less than that specified in the engine specification? (FAR 23.1163)
- (5) Is the starter overload prevention mechanism satisfactory to permit engaging and disengaging in order to deliver sufficient but not excessive cranking torque to motor the engine?
(FAR 23.1163)
- (6) Is the starter clearance envelope satisfactory with respect to interference, accessibility, inspection, maintenance, removal, and electrical connections to be made? (FAR 23.901)
- (7) **Is** the starter motor suitably protected from fuel, oil, water, and other detrimental conditions? (FAR 23.1351)

- (3) Is the starter motor installed so as to minimize contact with inflammables from fluid or **vapor lines** in the event of arcing or sparking of the motor?

c. Operational:

- (1) Does the starter dog properly mesh and fully engage the engine ~~dog~~, when the meshing cable or solenoid is actuated?
(FAR 23.1163)
- (2) Is there adequate clearance between the starter and engine dogs in the fully retracted position, to prevent riding of the dogs?
(Refer to manufacturer's instruction manual for clearance.)
(FAR 23.1163)

d. Detail Design:

- (1) Is the starter of a type that is acceptable under one of the following means?
- (a) Qualification under an AN or **MIL** specification.
 - (b) Completing a qualification test approved by FAA.
 - (c) Prior satisfactory **service** record on another approved installation.
- (FAR 23.1163)
- (2) Will the starter dog turn in the direction of rotation required by the engine dog? (FAR 23.1163)
- (3) Is the speed ratio of the starter accessory drive correct as recorded in the engine specification? (FAR 23.1163)
- (4) **Is** the maximum static torque delivered by the starter less than that specified in the engine specification? (FAR 23.1163)
- (5) Is the starter overload prevention mechanism satisfactory to permit engaging and disengaging in order to deliver sufficient but not excessive cranking torque to motor the engine?
(FAR 23.1163)
- (6) Is the starter clearance envelope satisfactory with respect to interference, accessibility, inspection, maintenance, removal, and electrical connections to be made? (FAR 23.901)
- (7) **Is** the starter motor suitably protected from fuel, oil, water, and other detrimental conditions? (FAR 23.1351)

- (3) Is the starter motor installed so as to minimize contact with inflammables from fluid or ~~vapor~~ **lines** in the event of arcing or sparking of the motor?

c. Operational:

- (1) Does the starter dog properly mesh and fully engage the engine ~~dog~~, when the meshing cable or solenoid is actuated?
(FAR 23.1163)
- (2) Is there adequate clearance between the starter and engine dogs in the fully retracted position, to prevent riding of the dogs?
(Refer to manufacturer's instruction manual for clearance.)
(FAR 23.1163)

d. Detail Design:

- (1) Is the starter of a type that is acceptable under one of the following means?
- (a) Qualification under an AN or **MIL** specification.
 - (b) Completing a qualification test approved by FAA.
 - (c) Prior satisfactory **service** record on another approved installation.
- (FAR 23.1163)
- (2) Will the starter dog turn in the direction of rotation required by the engine dog? (FAR 23.1163)
- (3) Is the speed ratio of the starter accessory drive correct as recorded in the engine specification? (FAR 23.1163)
- (4) **Is** the maximum static torque delivered by the starter less than that specified in the engine specification? (FAR 23.1163)
- (5) Is the starter overload prevention mechanism satisfactory to permit engaging and disengaging in order to deliver sufficient but not excessive cranking torque to motor the engine?
(FAR 23.1163)
- (6) Is the starter clearance envelope satisfactory with respect to interference, accessibility, inspection, maintenance, removal, and electrical connections to be made? (FAR 23.901)
- (7) **Is** the starter motor suitably protected from fuel, oil, water, and other detrimental conditions? (FAR 23.1351)

AIRWORTHINESS COMPLIANCE CHECK SHEET #9

1. SUBJECT: Battery Installations - FAR 25 Aircraft

2. APPLICABLE FEDERAL AVIATION REGULATIONS

- 25.301 Loads
- 25.305 Strength and Deformation
- 25.307 Proof of Structure
- 25.321 Flight Loads
- 25.471 Ground Loads
- 25.561 Emergency Landing Conditions
- 25.603 Materials
- 25.605 Fabrication Methods
- 25.607 Standard Fastenings
- 25.609 Protection
- 25.611 Inspection Provisions
- 25.613 Material Strength Properties and Design Values
- 25.1353 Electrical Equipment and Installations

Battery installations which are the same as those made by the airframe manufacturer, or other installations which are already approved, may be accepted without further investigation. On other installations, the following points should be checked to determine that the installation is satisfactory.

3. CHECKLIST

a. Structural Requirements:

- (1) Is the battery installed in such a manner that the installation can withstand the required loads? The effect on other structure (primary or secondary) should be considered. (~~FARs~~ 25.301, 25.305, 25.307, 25.321, 25.471, and 25.561.)

NOTE: This answer can be determined by a direct comparison with an existing approved installation having the same or similar (approximately same weight and size) equipment installed, by structural analysis, or by static test. Such installations do not necessarily lend themselves to analysis but are adaptable to static test. In conducting this test, the following procedure may be used:

- (a) Determine the weight and c.g. of the equipment.
- (b) Mount the equipment in the position in the airplane or simulate the equipment with a dummy so that the required **loads** can be applied at the c.g. position of the actual equipment.

AIRWORTHINESS COMPLIANCE CHECK SHEET #9

1. SUBJECT: Battery Installations - FAR 25 Aircraft

2. APPLICABLE FEDERAL AVIATION REGULATIONS

~~25.301~~ Loads
~~25.305~~ Strength and Deformation
~~25.307~~ Proof of Structure
~~25.321~~ Flight Loads
~~25.471~~ Ground Loads
~~25.561~~ Emergency Landing Conditions
~~25.603~~ Materials
~~25.605~~ Fabrication Methods
~~25.607~~ Standard Fastenings
~~25.609~~ Protection
~~25.611~~ Inspection Provisions
~~25.613~~ Material Strength Properties and Design Values
~~25.1353~~ Electrical Equipment and Installations

Battery installations which are the same as those made by the airframe manufacturer, or other installations which are already approved, may be accepted without further investigation. On other installations, the following points should be checked to determine that the installation is satisfactory.

3. CHECKLIST

a. Structural Requirements:

(1) **Is** the battery installed in such a manner that the installation can withstand the required loads? The effect on other structure (primary or secondary) should be considered. (~~FARs~~ 25.301, 25.305, 25.307, 25.321, 25.471, and 25.561.)

NOTE: This answer can be determined by a direct comparison with an existing approved installation having the same or similar (approximately same weight and size) equipment installed, by structural analysis, or by static test. Such installations do not necessarily lend themselves to analysis but are adaptable to static test. In conducting this test, the following procedure may be used:

(a) Determine the weight and **c.g.** of the equipment.

(b) Mount the equipment in the position in the airplane or simulate the equipment with a dummy so that the required **loads** can be applied at the **c.g.** position of the actual equipment.

AIRWORTHINESS COMPLIANCE CHECK SHEET #9

1. SUBJECT: Battery Installations - FAR 25 Aircraft

2. APPLICABLE FEDERAL AVIATION REGULATIONS

~~25.301~~ Loads
~~25.305~~ Strength and Deformation
~~25.307~~ Proof of Structure
~~25.321~~ Flight Loads
~~25.471~~ Ground Loads
~~25.561~~ Emergency Landing Conditions
~~25.603~~ Materials
~~25.605~~ Fabrication Methods
~~25.607~~ Standard Fastenings
~~25.609~~ Protection
~~25.611~~ Inspection Provisions
~~25.613~~ Material Strength Properties and Design Values
~~25.1353~~ Electrical Equipment and Installations

Battery installations which are the same as those made by the airframe manufacturer, or other installations which are already approved, may be accepted without further investigation. On other installations, the following points should be checked to determine that the installation is satisfactory.

3. CHECKLIST

a. Structural Requirements:

(1) **Is** the battery installed in such a manner that the installation can withstand the required loads? The effect on other structure (primary or secondary) should be considered. (~~FARs~~ 25.301, 25.305, 25.307, 25.321, 25.471, and 25.561.)

NOTE: This answer can be determined by a direct comparison with an existing approved installation having the same or similar (approximately same weight and size) equipment installed, by structural analysis, or by static test. Such installations do not necessarily lend themselves to analysis but are adaptable to static test. In conducting this test, the following procedure may be used:

(a) Determine the weight and **c.g.** of the equipment.

(b) Mount the equipment in the position in the airplane or simulate the equipment with a dummy so that the required **loads** can be applied at the **c.g.** position of the actual equipment.

AIRWORTHINESS COMPLIANCE CHECK SHEET #9

1. SUBJECT: Battery Installations - FAR 25 Aircraft

2. APPLICABLE FEDERAL AVIATION REGULATIONS

~~25.301~~ Loads
~~25.305~~ Strength and Deformation
~~25.307~~ Proof of Structure
~~25.321~~ Flight Loads
~~25.471~~ Ground Loads
~~25.561~~ Emergency Landing Conditions
~~25.603~~ Materials
~~25.605~~ Fabrication Methods
~~25.607~~ Standard Fastenings
~~25.609~~ Protection
~~25.611~~ Inspection Provisions
~~25.613~~ Material Strength Properties and Design Values
~~25.1353~~ Electrical Equipment and Installations

Battery installations which are the same as those made by the airframe manufacturer, or other installations which are already approved, may be accepted without further investigation. On other installations, the following points should be checked to determine that the installation is satisfactory.

3. CHECKLIST

a. Structural Requirements:

(1) **Is** the battery installed in such a manner that the installation can withstand the required loads? The effect on other structure (primary or secondary) should be considered. (~~FARs~~ 25.301, 25.305, 25.307, 25.321, 25.471, and 25.561.)

NOTE: This answer can be determined by a direct comparison with an existing approved installation having the same or similar (approximately same weight and size) equipment installed, by structural analysis, or by static test. Such installations do not necessarily lend themselves to analysis but are adaptable to static test. In conducting this test, the following procedure may be used:

(a) Determine the weight and **c.g.** of the equipment.

(b) Mount the equipment in the position in the airplane or simulate the equipment with a dummy so that the required **loads** can be applied at the **c.g.** position of the actual equipment.

AIRWORTHINESS COMPLIANCE CHECK SHEET #9

1. SUBJECT: Battery Installations - FAR 25 Aircraft

2. APPLICABLE FEDERAL AVIATION REGULATIONS

- 25.301 Loads
- 25.305 Strength and Deformation
- 25.307 Proof of Structure
- 25.321 Flight Loads
- 25.471 Ground Loads
- 25.561 Emergency Landing Conditions
- 25.603 Materials
- 25.605 Fabrication Methods
- 25.607 Standard Fastenings
- 25.609 Protection
- 25.611 Inspection Provisions
- 25.613 Material Strength Properties and Design Values
- 25.1353 Electrical Equipment and Installations

Battery installations which are the same as those made by the airframe manufacturer, or other installations which are already approved, may be accepted without further investigation. On other installations, the following points should be checked to determine that the installation is satisfactory.

3. CHECKLIST

a. Structural Requirements:

- (1) Is the battery installed in such a manner that the installation can withstand the required loads? The effect on other structure (primary or secondary) should be considered. (~~FARs~~ 25.301, 25.305, 25.307, 25.321, 25.471, and 25.561.)

NOTE: This answer can be determined by a direct comparison with an existing approved installation having the same or similar (approximately same weight and size) equipment installed, by structural analysis, or by static test. Such installations do not necessarily lend themselves to analysis but are adaptable to static test. In conducting this test, the following procedure may be used:

- (a) Determine the weight and c.g. of the equipment.
- (b) Mount the equipment in the position in the airplane or simulate the equipment with a dummy so that the required **loads** can be applied at the c.g. position of the actual equipment.

c. Operating Aspects:

- (1) Do test results show an adequate supply of fuel at the carburetor during normal operation and with the metering element blocked? (FAR ~~23.995.~~)

d. Detail Design Standards:

- (1) To insure an airworthy installation, is the flowmeter of an approved type?

Flowmeters approved for installation in civil aircraft prior to October **15, 1967**, may continue to be used. New models of fuel flowmeters manufactured after October **15, 1967**, shall conform to the requirements of ~~TSO-C44~~. In either case, final approval is dependent on the satisfactory installation of the flowmeter in the airplane.

- (2) Is the indicator and associated components properly installed?

To insure that the indicator and its associated components have been properly installed, the manufacturer's installation instructions should be reviewed. The Engineering Service Representative should be contacted ~~for~~ assistance in making this determination unless a supplementary compliance check sheet is available which covers the instrument installation portion.

c. Operating Aspects:

- (1) Do test results show an adequate supply of fuel at the carburetor during normal operation and with the metering element blocked? (FAR ~~23.995.~~)

d. Detail Design Standards:

- (1) To insure an airworthy installation, is the flowmeter of an approved type?

Flowmeters approved for installation in civil aircraft prior to October **15, 1967**, may continue to be used. New models of fuel flowmeters manufactured after October **15, 1967**, shall conform to the requirements of ~~TSO-C44~~. In either case, final approval is dependent on the satisfactory installation of the flowmeter in the airplane.

- (2) Is the indicator and associated components properly installed?

To insure that the indicator and its associated components have been properly installed, the manufacturer's installation instructions should be reviewed. The Engineering Service Representative should be contacted ~~for~~ assistance in making this determination unless a supplementary compliance check sheet is available which covers the instrument installation portion.

c. Operating Aspects:

- (1) Do test results show an adequate supply of fuel at the carburetor during normal operation and with the metering element blocked? (FAR ~~23.995.~~)

d. Detail Design Standards:

- (1) To insure an airworthy installation, is the flowmeter of an approved type?

Flowmeters approved for installation in civil aircraft prior to October **15, 1967**, may continue to be used. New models of fuel flowmeters manufactured after October **15, 1967**, shall conform to the requirements of ~~TSO-C44~~. In either case, final approval is dependent on the satisfactory installation of the flowmeter in the airplane.

- (2) Is the indicator and associated components properly installed?

To insure that the indicator and its associated components have been properly installed, the manufacturer's installation instructions should be reviewed. The Engineering Service Representative should be contacted ~~for~~ assistance in making this determination unless a supplementary compliance check sheet is available which covers the instrument installation portion.

AIRWORTHINESS COMPLIANCE CHECK SHEET #12

1. SUBJECT: ~~Modification of an Airplane~~ to Relocate an Auxiliary Fuel Tank
Without Altering the Fuel System Arrangement. 0- FAR 23 Aircraft

2. APPLICABLE FEDERAL AVIATION REGULATIONS

23.955 Fuel Flow Rate

Fuel Flow Rate for Gravity System

Fuel Flow Rate for Pump System

Fuel Flow Rate for Auxiliary Fuel System and Fuel Transfer
Systems

23.957 Flow Between Interconnected Tanks

23.959 Determination of Unusable Fuel Supply and Fuel System
Operation on Low Fuel

23.961 Fuel System Hot Weather Operation

23.963 Fuel Tank - General

23.965 Fuel Tank Tests

23.967 Fuel Tank Installation

23.969 Fuel Tank Expansion Space

23.971 Fuel Tank Sump

23.973 Fuel Tank Filler Connection

23.975 Fuel Tank Vents and Carburetor Vapor Vents

23.1589 Loading Information

3. CHECKLIST

a. Structural Requirements:

- (1) If changes or alterations of the airplane structure are made,
have the original strength and integrity of the structure been
retained? (AC 43.13-2 Chapter 1.)

NOTE: If the specific alteration cannot be evaluated using AC 43.13-1
or equivalent references, it should be referred to the
Engineering Service Representative.

- (2) Has the modification been evaluated to determine to what extent
the c.g. of the airplane will be affected? (FAR 23.1589.)

- (3) Is the fuel tank properly and adequately supported? (FAR 23.967)

- (4) Are all lines properly supported? (FAR 23.993.)?

AIRWORTHINESS COMPLIANCE CHECK SHEET #12

1. SUBJECT: ~~Modification of an Airplane~~ to Relocate an Auxiliary Fuel Tank Without Altering the Fuel System Arrangement. - FAR 23 Aircraft

2. APPLICABLE FEDERAL AVIATION REGULATIONS

- 23.955 Fuel Flow Rate
 - Fuel Flow Rate for Gravity System
 - Fuel Flow Rate for Pump System
 - Fuel Flow Rate for Auxiliary Fuel System and Fuel Transfer Systems
- 23.957 Flow Between Interconnected Tanks
- 23.959 Determination of Unusable Fuel Supply and Fuel System Operation on Low Fuel
- 23.961 Fuel System Hot Weather Operation
- 23.963 Fuel Tank - General
- 23.965 Fuel Tank Tests
- 23.967 Fuel Tank Installation
- 23.969 Fuel Tank Expansion Space
- 23.971 Fuel Tank Sump
- 23.973 Fuel Tank Filler Connection
- 23.975 Fuel Tank Vents and Carburetor Vapor Vents
- 23.1589 Loading Information

3. CHECKLIST

a. structural Requirements:

- (1) If changes or alterations of the airplane structure are made, have the original strength and integrity of the structure been retained? (AC 43.13-2 Chapter 1.)

NOTE: If the specific alteration cannot be evaluated using AC 43.13-1 or equivalent references, it should be referred to the Engineering Service Representative.

- (2) Has the modification been evaluated to determine to what extent the c.g. of the airplane will be affected? (FAR 23.1589.)

- (3) Is the fuel tank properly and adequately supported? (FAR 23.967)

- (4) Are all lines properly supported? (FAR 23.993.)?

AIRWORTHINESS COMPLIANCE CHECK SHEET #12

1. SUBJECT: ~~Modification of an Airplane to Relocate an Auxiliary Fuel Tank~~
Without Altering the Fuel System ~~Arrangement~~. 0- FAR 23 Aircraft

2. APPLICABLE FEDERAL AVIATION REGULATIONS

- ~~23.955~~ Fuel Flow Rate
Fuel Flow Rate for Gravity System
Fuel Flow Rate for Pump System
Fuel Flow Rate for Auxiliary Fuel System and Fuel Transfer Systems
~~23.957~~ Flow Between ~~Interconnec~~ted Tanks
~~23.959~~ Determination of Unusable Fuel Supply and Fuel System Operation on Low Fuel
~~23.961~~ Fuel System Hot Weather Operation
~~23.963~~ Fuel Tank - General
~~23.965~~ Fuel Tank Tests
~~23.967~~ Fuel Tank ~~Installation~~
~~23.969~~ Fuel Tank Expansion Space
~~23.971~~ Fuel Tank Sump
~~23.973~~ Fuel Tank Filler Connection
~~23.975~~ Fuel Tank Vents and Carburetor Vapor Vents
~~23.1589~~ Loading Information

3. CHECKLIST

a. structural Requirements:

- (1) If changes or alterations of the airplane structure are made, have the original strength ~~and~~ integrity of the structure been retained? (AC ~~43.13-4~~ Chapter 1.)

NOTE: If the specific alteration cannot be evaluated using AC ~~43.13-1~~ or equivalent references, it should be referred to the Engineering Service Representative.

- (2) Has the modification been evaluated to determine to what extent the c.g. of the airplane will be affected? (FAR ~~23.1589.~~)

- (3) ~~Is~~ the fuel tank properly and adequately supported? (FAR ~~23.967~~)

- (4) Are ~~all lines~~ properly supported? (FAR ~~23.993.~~)?

AIRWORTHINESS COMPLIANCE CHECK SHEET #12

1. SUBJECT: ~~Modification of an Airplane to Relocate an Auxiliary Fuel Tank~~
Without Altering the Fuel System ~~Arrangement~~. 0- FAR 23 Aircraft

2. APPLICABLE FEDERAL AVIATION REGULATIONS

- ~~23.955~~ Fuel Flow Rate
Fuel Flow Rate for Gravity System
Fuel Flow Rate for Pump System
Fuel Flow Rate for Auxiliary Fuel System and Fuel Transfer Systems
~~23.957~~ Flow Between Interconnected Tanks
~~23.959~~ Determination of Unusable Fuel Supply and Fuel System Operation on Low Fuel
~~23.961~~ Fuel System Hot Weather Operation
~~23.963~~ Fuel Tank - General
~~23.965~~ Fuel Tank Tests
~~23.967~~ Fuel Tank ~~Installation~~
~~23.969~~ Fuel Tank Expansion Space
~~23.971~~ Fuel Tank Sump
~~23.973~~ Fuel Tank Filler Connection
~~23.975~~ Fuel Tank Vents and Carburetor Vapor Vents
~~23.1589~~ Loading Information

3. CHECKLIST

a. structural Requirements:

- (1) If changes or alterations of the airplane structure are made, have the original strength and integrity of the structure been retained? (AC ~~43.13-2~~ Chapter 1.)

NOTE: If the specific alteration cannot be evaluated using AC ~~43.13-1~~ or equivalent references, it should be referred to the Engineering Service Representative.

- (2) Has the modification been evaluated to determine to what extent the c.g. of the airplane will be affected? (FAR ~~23.1589.~~)

- (3) ~~Is~~ the fuel tank properly and adequately supported? (FAR ~~23.967~~)

- (4) Are ~~all lines~~ properly supported? (FAR ~~23.993.~~)?

CHAPTER 2. AIRFRAME

AIRWORTHINESS COMPLIANCE CHECK SHEET #13

1. SUBJECT: **Modification** and/or Installation of Seats - FAR 23 Aircraft

2. APPLICABLE FEDERAL AVIATION REGULATIONS

~~21.305~~ Approval of Material, Parts, Processes and Appliances

~~23.23~~ Weight and Balance

~~23.301~~ Loads

~~23.307~~ Proof of Structure

~~23.561~~ Protection

~~23.603~~ Materials and Workmanship

~~23.605~~ Fabrication Methods

~~23.607~~ Standard Fastenings

~~23.609~~ Protection

~~23.613~~ Material Strength Properties and Design Values

~~23.785~~ Seats and Berths

~~23.807~~ Exits

~~23.1301~~ Functional and Installation Requirements

~~23.1413~~ Safety Belts

~~23.1589~~ Center Gravity Position

Modifications and/or installations of seats which are the same as those made by the manufacturer or other parties wherein previous approval has been obtained may be accepted without further investigation. When the modifications and/or installations are different from those previously approved, the following points are to be checked to assure satisfactory compliance.

3. CHECKLIST: SEAT MODIFICATION - FAR 23 AIRCRAFT

a. Structural Requirements

(1) Is the structure of the modified seat adequate to support the required loads? (FAR 23.301, .307, .561, .785)

This can be determined by one of the following methods:

(a) By direct comparison with an existing approved modification which has the same or similar weight, size, and design.

(b) By structural analysis or static test. Seat structures may not always lend themselves readily to analysis, but are normally adaptable to static test.

CHAPTER 2. AIRFRAME

AIRWORTHINESS COMPLIANCE CHECK SHEET #13

1. SUBJECT: **Modification** and/or Installation of Seats - FAR 23 Aircraft

2. APPLICABLE FEDERAL AVIATION REGULATIONS

~~21.305~~ Approval of Material, Parts, Processes and Appliances

~~23.23~~ Weight and Balance

~~23.301~~ Loads

~~23.307~~ Proof of Structure

~~23.561~~ Protection

~~23.603~~ Materials and Workmanship

~~23.605~~ Fabrication Methods

~~23.607~~ Standard Fastenings

~~23.609~~ Protection

~~23.613~~ Material Strength Properties and Design Values

~~23.785~~ Seats and Berths

~~23.807~~ Exits

~~23.1301~~ Functional and Installation Requirements

~~23.1413~~ Safety Belts

~~23.1589~~ Center Gravity Position

Modifications and/or installations of seats which are the same as those made by the manufacturer or other parties wherein previous approval has been obtained may be accepted without further investigation. When the modifications and/or installations are different from those previously approved, the following points are to be checked to assure satisfactory compliance.

3. CHECKLIST: SEAT MODIFICATION - FAR 23 AIRCRAFT

a. Structural Requirements

(1) Is the structure of the modified seat adequate to support the required loads? (FAR ~~23.301, .307, .561, 0785~~)

This can be determined by one of the following methods:

(a) By direct comparison with an existing approved modification which has the same or similar weight, size, and design.

(b) By structural analysis or static test. Seat structures may not always lend themselves readily to analysis, but are normally adaptable to static test.

CHAPTER 2. AIRFRAME

AIRWORTHINESS COMPLIANCE CHECK SHEET #13

1. SUBJECT: **Modification** and/or Installation of Seats - FAR 23 Aircraft

2. APPLICABLE FEDERAL AVIATION REGULATIONS

~~21.305~~ Approval of Material, Parts, Processes and Appliances

~~23.23~~ Weight and Balance

~~23.301~~ Loads

~~23.307~~ Proof of Structure

~~23.561~~ Protection

~~23.603~~ Materials and Workmanship

~~23.605~~ Fabrication Methods

~~23.607~~ Standard Fastenings

~~23.609~~ Protection

~~23.613~~ Material Strength Properties and Design Values

~~23.785~~ Seats and Berths

~~23.807~~ Exits

~~23.1301~~ Functional and Installation Requirements

~~23.1413~~ Safety Belts

~~23.1589~~ Center Gravity Position

Modifications and/or installations of seats which are the same as those made by the manufacturer or other parties wherein previous approval has been obtained may be accepted without further investigation. When the modifications and/or installations are different from those previously approved, the following points are to be checked to assure satisfactory compliance.

3. CHECKLIST: SEAT MODIFICATION - FAR 23 AIRCRAFT

a. Structural Requirements

(1) Is the structure of the modified seat adequate to support the required loads? (FAR ~~23.301, .307, .561, 0785~~)

This can be determined by one of the following methods:

(a) By direct comparison with an existing approved modification which has the same or similar weight, size, and design.

(b) By structural analysis or static test. Seat structures may not always lend themselves readily to analysis, but are normally adaptable to static test.

CHAPTER 2. AIRFRAME

AIRWORTHINESS COMPLIANCE CHECK SHEET #13

1. SUBJECT: **Modification** and/or Installation of Seats - FAR 23 Aircraft

2. APPLICABLE FEDERAL AVIATION REGULATIONS

~~21.305~~ Approval of Material, Parts, Processes and Appliances

~~23.23~~ Weight and Balance

~~23.301~~ Loads

~~23.307~~ Proof of Structure

~~23.561~~ Protection

~~23.603~~ Materials and Workmanship

~~23.605~~ Fabrication Methods

~~23.607~~ Standard Fastenings

~~23.609~~ Protection

~~23.613~~ Material Strength Properties and Design Values

~~23.785~~ Seats and Berths

~~23.807~~ Exits

~~23.1301~~ Functional and Installation Requirements

~~23.1413~~ Safety Belts

~~23.1589~~ Center Gravity Position

Modifications and/or installations of seats which are the same as those made by the manufacturer or other parties wherein previous approval has been obtained may be accepted without further investigation. When the modifications and/or installations are different from those previously approved, the following points are to be checked to assure satisfactory compliance.

3. CHECKLIST: SEAT MODIFICATION - FAR 23 AIRCRAFT

a. Structural Requirements

(1) Is the structure of the modified seat adequate to support the required loads? (FAR ~~23.301~~, ~~.307~~, ~~.561~~, ~~0785~~)

This can be determined by one of the following methods:

(a) By direct comparison with an existing approved modification which has the same or similar weight, size, and design.

(b) By structural analysis or static test. Seat structures may not always lend themselves readily to analysis, but are normally adaptable to static test.

CHAPTER 2. AIRFRAME

AIRWORTHINESS COMPLIANCE CHECK SHEET #13

1. SUBJECT: ~~Modification~~ and/or Installation of Seats - FAR 23 Aircraft

2. APPLICABLE FEDERAL AVIATION REGULATIONS

~~21.305~~ Approval of Material, Parts, Processes and Appliances

~~23.23~~ Weight and Balance

~~23.301~~ Loads

~~23.307~~ Proof of Structure

~~23.561~~ Protection

~~23.603~~ Materials and Workmanship

~~23.605~~ Fabrication Methods

~~23.607~~ Standard Fastenings

~~23.609~~ Protection

~~23.613~~ Material Strength Properties and Design Values

~~23.785~~ Seats and Berths

~~23.807~~ Exits

~~23.1301~~ Functional and Installation Requirements

~~23.1413~~ Safety Belts

~~23.1589~~ Center Gravity Position

Modifications and/or installations of seats which are the same as those made by the manufacturer or other parties wherein previous approval has been obtained may be accepted without further investigation. When the modifications and/or installations are different from those previously approved, the following points are to be checked to assure satisfactory compliance.

3. CHECKLIST: SEAT MODIFICATION - FAR 23 AIRCRAFT

a. Structural Requirements

(1) Is the structure of the modified seat adequate to support the required loads? (FAR 23.301, .307, .561, .785)

This can be determined by one of the following methods:

(a) By direct comparison with an existing approved modification which has the same or similar weight, size, and design.

(b) By structural analysis or static test. Seat structures may not always lend themselves readily to analysis, but are normally adaptable to static test.

CHAPTER 2. AIRFRAME

AIRWORTHINESS COMPLIANCE CHECK SHEET #13

1. SUBJECT: ~~Modification~~ and/or Installation of Seats - FAR 23 Aircraft

2. APPLICABLE FEDERAL AVIATION REGULATIONS

~~21.305~~ Approval of Material, Parts, Processes and Appliances

~~23.23~~ Weight and Balance

~~23.301~~ Loads

~~23.307~~ Proof of Structure

~~23.561~~ Protection

~~23.603~~ Materials and Workmanship

~~23.605~~ Fabrication Methods

~~23.607~~ Standard Fastenings

~~23.609~~ Protection

~~23.613~~ Material Strength Properties and Design Values

~~23.785~~ Seats and Berths

~~23.807~~ Exits

~~23.1301~~ Functional and Installation Requirements

~~23.1413~~ Safety Belts

~~23.1589~~ Center Gravity Position

Modifications and/or installations of seats which are the same as those made by the manufacturer or other parties wherein previous approval has been obtained may be accepted without further investigation. When the modifications and/or installations are different from those previously approved, the following points are to be checked to assure satisfactory compliance.

3. CHECKLIST: SEAT MODIFICATION - FAR 23 AIRCRAFT

a. Structural Requirements

(1) Is the structure of the modified seat adequate to support the required loads? (FAR 23.301, .307, .561, 0785)

This can be determined by one of the following methods:

(a) By direct comparison with an existing approved modification which has the same or similar weight, size, and design.

(b) By structural analysis or static test. Seat structures may not always lend themselves readily to analysis, but are normally adaptable to static test.

This can be determined by the application of loads as described in FAR ~~25.785~~. In conducting the static tests on the seat and seat attachment to structure, the procedure as described in ~~TSO-C25a/C39~~ should be followed.

b. Hazards to the Aircraft or its Occupants

- (1) Does the seat installation create any hazard to other passengers or can it contribute to a serious injury in the ~~event~~ of a minor crash landing? (FAR ~~25.561~~ and ~~25.1413~~)
- (2) Has it been demonstrated that the seat installation functions properly in the airplane? (FAR ~~25.1301~~)
- (3) Has the weight and balance effect of the seat installation been considered? (FAR ~~25.25~~, ~~25.27~~)
- (4) Does the seat installation have any adverse effect regarding the access to emergency exit(s) or width of the main passenger aisle? (FAR ~~25.813~~ and ~~25.815~~)

c. Detail Design Standards

- (1) If the seat does not have TSO approval, do the design standards comply with approved requirements? (FAR ~~25.785~~)

This can be determined by the application of loads as described in FAR ~~25.785~~. In conducting the static tests on the seat and seat attachment to structure, the procedure as described in ~~TSO-C25a/C39~~ should be followed.

b. Hazards to the Aircraft or its Occupants

- (1) Does the seat installation create any hazard to other passengers or can it contribute to a serious injury in the event of a minor crash landing? (FAR ~~25.561~~ and ~~25.1413~~)
- (2) Has it been demonstrated that the seat installation functions properly in the airplane? (FAR ~~25.1301~~)
- (3) Has the weight and balance effect of the seat installation been considered? (FAR ~~25.25~~, ~~25.27~~)
- (4) Does the seat installation have any adverse effect regarding the access to emergency exit(s) or width of the main passenger aisle? (FAR ~~25.813~~ and ~~25.815~~)

c. Detail ~~Design~~ Standards

- (1) If the seat does not have ~~TSO~~ approval, do the design standards comply with approved requirements? (FAR ~~25.785~~)

This can be determined by the application of loads as described in FAR ~~25.785~~. In conducting the static tests on the seat and seat attachment to structure, the procedure as described in ~~TSO-C25a/C39~~ should be followed.

b. Hazards to the Aircraft or its Occupants

- (1) Does the seat installation create any hazard to other passengers or can it contribute to a serious injury in the ~~event~~ of a minor crash landing? (FAR ~~25.561~~ and ~~25.1413~~)
- (2) Has it been demonstrated that the seat installation functions properly in the airplane? (FAR ~~25.1301~~)
- (3) Has the weight and balance effect of the seat installation been considered? (FAR ~~25.25~~, ~~25.27~~)
- (4) Does the seat installation have any adverse effect regarding the access to emergency exit(s) or width of the main passenger aisle? (FAR ~~25.813~~ and ~~25.815~~)

c. Detail ~~Design~~ Standards

- (1) If the seat does not have TSO approval, do the ~~d~~ **esign** standards comply with approved **requirements?** (FAR ~~25.785~~)

This can be determined by the application of loads as described in FAR ~~25.785~~. In conducting the static tests on the seat and seat attachment to structure, the procedure as described in ~~TSO-C25a/C39~~ should be followed.

b. Hazards to the Aircraft or its Occupants

- (1) Does the seat installation create any hazard to other passengers or can it contribute to a serious injury in the ~~event~~ of a minor crash landing? (FAR ~~25.561~~ and ~~25.1413~~)
- (2) Has it been demonstrated that the seat installation functions properly in the airplane? (FAR ~~25.1301~~)
- (3) Has the weight and balance effect of the seat installation been considered? (FAR ~~25.25~~, ~~25.27~~)
- (4) Does the seat installation have any adverse effect regarding the access to emergency exit(s) or width of the main passenger aisle? (FAR ~~25.813~~ and ~~25.815~~)

c. Detail ~~Design~~ Standards

- (1) If the seat does not have TSO approval, do the ~~d~~ **esign** standards comply with approved **requirements?** (FAR ~~25.785~~)

NOTE: A night-flight check should be performed to check landing light effectiveness.

- (2) Is **the** landing light switch located so as to be readily accessible to **the** pilot? (FAR **23.1301.**)
- (3) Is **the** landing light **switch** adequately labeled as to operation and function performed? (FAR **23.1301.**)

d. Detail Design Standards:

- (1) Are the electric cables for the landing light installed in such a manner that they are suitably protected from fuel, oil, water and other detrimental substances, and mechanical damage? (FAR **23.1351.**)
- (2) Is the circuit to **the** landing light connected through the master switch arrangement? (FAR **23.1361.**)

NOTE: A flight check should be performed to determine possible adverse flight characteristics with light in extended position.

NOTE : A night-flight check should be performed to check landing light effectiveness.

- (2) Is the landing light switch located so as to be readily accessible to the pilot? (FAR ~~23.1301.~~)
- (3) Is the landing light switch adequately labeled as to operation and function performed? (FAR ~~23.1301.~~)

d. Detail Design Standards:

- (1) Are the electric cables for the landing light installed in such a manner that they are suitably protected from fuel, oil, water and other detrimental substances, and mechanical damage? (FAR ~~23.1351.~~)
- (2) Is the circuit to the landing light connected through the master switch arrangement? (FAR ~~23.1361.~~)

NOTE: A flight check should be performed to determine possible adverse flight characteristics with light in extended position.

NOTE : A night-flight check should be performed to check landing light effectiveness.

- (2) Is the landing light switch located so as to be readily accessible to the pilot? (FAR ~~23.1301.~~)
- (3) Is the landing light switch adequately labeled as to operation and function performed? (FAR ~~23.1301.~~)

d. Detail Design Standards:

- (1) Are the electric cables for the landing light installed in such a manner that they are suitably protected from fuel, oil, water and other detrimental substances, and mechanical damage? (FAR ~~23.1351.~~)
- (2) Is the circuit to the landing light connected through the master switch arrangement? (FAR ~~23.1361.~~)

NOTE: A flight check should be performed to determine possible adverse flight characteristics with light in extended position.

NOTE: A night-flight check should be performed to check landing light effectiveness.

- (2) Is the landing light switch located so as to be readily accessible to the pilot? (FAR ~~23.1301.~~)
- (3) Is the landing light switch adequately labeled as to operation and function performed? (FAR ~~23.1301.~~)

d. Detail Design Standards:

- (1) Are the electric cables for the landing light installed in such a manner that they are suitably protected from fuel, oil, water and other detrimental substances, and mechanical damage? (FAR ~~23.1351.~~)
- (2) Is the circuit to the landing light connected through the master switch arrangement? (FAR ~~23.1361.~~)

NOTE: A flight check should be performed to determine possible adverse flight characteristics with light in extended position.

NOTE : A night-flight check should be performed to check landing light effectiveness.

- (2) Is the landing light switch located so as to be readily accessible to the pilot? (FAR ~~23.1301.~~)
- (3) Is the landing light switch adequately labeled as to operation and function performed? (FAR ~~23.1301.~~)

d. Detail Design Standards:

- (1) Are the electric cables for the landing light installed in such a manner that they are suitably protected from fuel, oil, water and other detrimental substances, and mechanical damage? (FAR ~~23.1351.~~)
- (2) Is the circuit to the landing light connected through the master switch arrangement? (FAR ~~23.1361.~~)

NOTE: A flight check should be performed to determine possible adverse flight characteristics with light in extended position.

NOTE : A night-flight check should be performed to check landing light effectiveness.

- (2) Is the landing light switch located so as to be readily accessible to the pilot? (FAR ~~23.1301.~~)
- (3) Is the landing light switch adequately labeled as to operation and function performed? (FAR ~~23.1301.~~)

d. Detail Design Standards:

- (1) Are the electric cables for the landing light installed in such a manner that they are suitably protected from fuel, oil, water and other detrimental substances, and mechanical damage? (FAR ~~23.1351.~~)
- (2) Is the circuit to the landing light connected through the master switch arrangement? (FAR ~~23.1361.~~)

NOTE: A flight check should be performed to determine possible adverse flight characteristics with light in extended position.

AIRWORTHINESS COMPLIANCE CHECK SHEET #17

1. SUBJECT: Interior Light Installations - FAR 23 Aircraft

2. APPLICABLE FEDERAL AVIATION REGULATIONS

23.773 Vision

23.1301 Functional and Installational Requirements

23.1351 Electrical System Installations

Generator

23.1361 Master Switch Arrangement

23.1357 Fuses or Circuit Breakers

23.1381 Instrument Lights

Instrument Light Installations

Interior light installations which are the same as those made by the airframe manufacturer or other installations which are already approved, may be accepted without further investigation. On other installations, the following points should be checked to determine that the installation is satisfactory.

3. CHECKLIST

a. Structural Requirements:

Caution should be used in attaching lights, receptacles, or wire bundles to primary structure. Holes or notches may have an adverse effect on structural integrity and should be judiciously placed.

b. Hazards to the Aircraft or its Occupants:

(1) ~~If~~ instrument lights are installed, are they of such construction that there is sufficient distance or insulating material between current carrying parts and the housing so that vibration in flight will not cause shorting? (FAR 23.1381.)

(2) Are the instrument lights and other cabin lights so installed that their direct rays (or reflected rays from the windshield or other surfaces) are shielded from the pilot's eyes? (FARs 23.773, and 23.1381.) .

(3) Are interior lighting fixtures so installed that lamps do not come in close proximity with combustibles such as interior trim or baggage? (FAR 23.1351.)

AIRWORTHINESS COMPLIANCE CHECK SHEET #17

1. SUBJECT: Interior Light Installations - FAR 23 Aircraft

2. APPLICABLE FEDERAL AVIATION REGULATIONS

23.773 Vision

23.1301 Functional and Installational Requirements

23.1351 Electrical System Installations

Generator

23.1361 Master Switch Arrangement

23.1357 Fuses or Circuit Breakers

23.1381 Instrument Lights

Instrument Light Installations

Interior light installations which are the same as those made by the airframe manufacturer or other installations which are already approved, may be accepted without further investigation. On other installations, the following points should be checked to determine that the installation is satisfactory.

3. CHECKLIST

a. Structural Requirements:

Caution should be used in attaching lights, receptacles, or wire bundles to primary structure. Holes or notches may have an adverse effect on structural integrity and should be judiciously placed.

b. Hazards to the Aircraft or its Occupants:

(1) If instrument lights are installed, are they of such construction that there is sufficient distance or insulating material between current carrying parts and the housing so that vibration in flight will not cause shorting? (FAR 23.1381.)

(2) Are the instrument lights and other cabin lights so installed that their direct rays (or reflected rays from the windshield or other surfaces) are shielded from the pilot's eyes? (FARs 23.773, and 23.1381.)

(3) Are interior lighting fixtures so installed that lamps do not come in close proximity with combustibles such as interior trim or baggage? (FAR 23.1351.)

AIRWORTHINESS COMPLIANCE CHECK SHEET #18

1. SUBJECT: Interior Light Installations - FAR 25 Aircraft

- 25.1301 Functional and installational requirements
- 25.1309 Equipment, systems, and installations
- 25.1351 Electrical system capacity
- 25.1353 Electrical equipment and installations
- 25.1357 Electrical protection
- 25.1363 Electrical system tests and analyses
- 25.1387 Instrument lights

Interior light installations which are the same as those made by the airframe manufacturer or other installations which are already approved, may be accepted without further investigation. On other installations, the following points should be checked to determine that the installation is satisfactory.

3. CHECKLIST

a. Structural Requirements:

Caution should be used in attaching lights, receptacles ~~or~~ wire bundles to primary structure. Holes or notches ~~may~~ have an adverse effect on the structural integrity and should be judiciously placed.

b. Hazards to the Aircraft or its Occupants:

- (1) Are the instrument lights and other interior lights of such design that there is sufficient distance or insulating material between current carrying parts and the housing so that vibration in flight will not cause shorting? (FAR 25.1309.)
- (2) Are the interior lighting fixtures so installed that a probable malfunction will not expose the crew or passengers to harmful electric shock? (FAR 25.1309.)
- (3) Are the instrument lights and other cabin lights so installed that their direct rays (or reflected rays from the windshield or other surfaces) are shielded from the ~~pilot's~~ eyes? (FAR 25.1387)
- (4) Are interior lighting fixtures so installed that lamps do not come in close proximity with combustibles such as interior trim or baggage? (FAR 25.1309.)

AIRWORTHINESS COMPLIANCE CHECK SHEET #18

1. SUBJECT: Interior Light Installations - FAR 25 Aircraft

- 25.1301 Functional and installational requirements
- 25.1309 Equipment, systems, and installations
- 25.1351 Electrical system capacity
- 25.1353 Electrical equipment and installations
- 25.1357 Electrical protection
- 25.1363 Electrical system tests and analyses
- 25.1387 Instrument lights

Interior light installations which are the same as those made by the airframe manufacturer or other installations which are already approved, may be accepted without further investigation. On other installations, the following points should be checked to determine that the installation is satisfactory.

3. CHECKLIST

a. Structural Requirements:

Caution should be used in **attaching** lights, receptacles or wire bundles to primary structure. Holes or notch&s may have an adverse effect on the structural integrity and should be judiciously placed.

b. Hazards to the Aircraft or its Occupants:

- (1) Are the instrument lights and other interior lights of such design that there is sufficient distance or insulating material between current carrying parts and the housing so that vibration in flight will not cause shorting? (FAR 25.1309.)
- (2) Are the interior lighting fixtures so installed that a probable malfunction will not expose the crew or passengers to harmful electric shock? (FAR 25.1309.)
- (3) Are the instrument lights and other cabin lights so installed that their direct rays (or reflected rays from the windshield or other surfaces) are shielded from the ~~pilot's~~ eyes? (FAR 25.1387)
- (4) Are interior lighting fixtures so installed that lamps do not come in close proximity with combustibles such as interior trim or baggage? (FAR 25.1309.)

AIRWORTHINESS COMPLIANCE CHECK SHEET #18

1. SUBJECT: Interior Light Installations - FAR 25 Aircraft

- 25.1301 Functional and installational requirements
- 25.1309 Equipment, systems, and installations
- 25.1351 Electrical system capacity
- 25.1353 Electrical equipment and installations
- 25.1357 Electrical protection
- 25.1363 Electrical system tests and analyses
- 25.1387 Instrument lights

Interior light installations which are the same as those made by the airframe manufacturer or other installations which are already approved, may be accepted without further investigation. On other installations, the following points should be checked to determine that the installation is satisfactory.

3. CHECKLIST

a. Structural Requirements:

Caution should be used in **attaching** lights, receptacles or wire bundles to primary structure. Holes or notch&s may have an adverse effect on the structural integrity and should be judiciously placed.

b. Hazards to the Aircraft or its Occupants:

- (1) Are the instrument lights and other interior lights of such design that there is sufficient distance or insulating material between current carrying parts and the housing so that vibration in flight will not cause shorting? (FAR 25.1309.)
- (2) Are the interior lighting fixtures so installed that a probable malfunction will not expose the crew or passengers to harmful electric shock? (FAR 25.1309.)
- (3) Are the instrument lights and other cabin lights so installed that their direct rays (or reflected rays from the windshield or other surfaces) are shielded from the ~~pilot's~~ eyes? (FAR 25.1387)
- (4) Are interior lighting fixtures so installed that lamps do not come in close proximity with combustibles such as interior trim or baggage? (FAR 25.1309.)

installations involving cutting of pressurized fuselage structure or fin and rudder installations, the regional Engineering Service Representative should be contacted for assistance in the evaluation.

- (2) Will the installation affect the flutter and vibration characteristics of the aircraft? (FAR **25.629**)

NOTE: The regional Engineering Service Representative should be contacted for assistance in evaluating this installation, particularly if it involves the fin, rudder, or top of fuselage just forward of the fin.

b. Hazards to the Aircraft or its Occupants:

- (1) Are the anticollision lights so located that their output is not detrimental to the flight **crew's** vision? (FARs **25.773** and **25.1401**)

NOTE: A night-flight check should be performed to determine that there are no hazardous reflections from such sources as the propeller discs, nacelles or wing surfaces.

- (2) Are the anticollision lights so located that they do not detract from the **conspicuity** of the position lights? (FAR **25.1401.**)
- (3) Is a fuse or circuit breaker (of a rating appropriate to the cable used) installed? (FAR **25.1357.**)
- (4) If a circuit breaker is used, is it of a type which will open the circuit irrespective of the position of the control, in case of a fault? (FAR **25.1357**)

c. Operating Aspects:

- (1) Does the system illuminate in all directions within 30° above and 30° below **the** horizontal plane of the aircraft, except for a solid angle obstructed visibility not exceeding **0.03 steradians** in the rearward direction? (FAR **25.1401**) A relatively simple method to determine the solid angle obstruction due to the tail fin is as follows:

- (a) Position the **levelled** aircraft in a darkened hangar so that its longitudinal axis is perpendicular to the hangar wall. Place a small light at the desired top anticollision light location. Measure the areas of the tail fin shadow on the wall above the height of the lamp. This area, divided by the square of the distance 'from lamp to wall ~~on~~ **in the same units**), is approximately equal to the solid angle obstruction in **steradians**. The distance from lamp to wall should be as large as practicable to keep errors low.

installations involving cutting of pressurized fuselage structure or fin and **rudder** installations, the regional Engineering Service Representative should be contacted for assistance in the evaluation.

- (2) Will the installation affect the flutter and vibration characteristics of the aircraft? (FAR **25.629**)

NOTE: The regional Engineering Service Representative should be contacted for assistance in evaluating this installation, particularly if it involves the fin, rudder, or top of fuselage just forward of the fin.

b. Hazards to the Aircraft or its Occupants:

- (1) Are the anticollision lights so located that their output is not detrimental to the flight **crew's** vision? (FARs **25.773** and **25.1401**)

NOTE: A night-flight check should be performed to determine that there are no hazardous reflections from such sources as the propeller discs, nacelles or wing surfaces.

- (2) Are the anticollision lights so located that they do not detract from the **conspicuity** of the position lights? (FAR **25.1401.**)
- (3) Is a fuse or circuit breaker (of a rating appropriate to the cable used) installed? (FAR **25.1357.**)
- (4) If a circuit breaker is used, is it of a type which will open the circuit irrespective of the position of the control, in case of a fault? (FAR **25.1357**)

c. Operating Aspects:

- (1) Does the system illuminate in all directions within 30° above and 30° below **the** horizontal plane of the aircraft, **except for a** solid angle obstructed visibility not exceeding **0.03 steradians** in the rearward direction? (FAR **25.1401**) A relatively simple method to determine the solid angle obstruction due to the tail fin is as follows:

- (a) Position the **levelled** aircraft in a darkened hangar so that its longitudinal axis is perpendicular to the hangar wall. Place a small light at the desired top anticollision light location. Measure the areas of **the** tail fin shadow on the wall above the height of the lamp. This area, divided by the square of the distance 'from lamp to wall ~~on~~ the same units)) is approximately equal to the solid angle obstruction in **steradians**. The distance from lamp to wall should be as large as practicable to **keep** errors low.

installations involving cutting of pressurized fuselage structure or fin and rudder installations, the regional Engineering Service Representative should be contacted for assistance in the evaluation.

- (2) Will the installation affect the flutter and vibration characteristics of the aircraft? (FAR ~~25.629~~)

NOTE: The regional Engineering Service Representative should be contacted for assistance in evaluating this installation, particularly if it involves the fin, rudder, or top of fuselage just forward of the fin.

b. Hazards to the Aircraft or its Occupants:

- (1) Are the anticollision lights so located that their output is not detrimental to the flight ~~crew's~~ vision? (~~FARs 25.773 and 25.1401~~)

NOTE: A night-flight check should be performed to determine that there are no hazardous reflections from such sources as the propeller discs, nacelles or wing surfaces.

- (2) Are the anticollision lights so located that they do not detract from the **conspicuity** of the position lights? (FAR ~~25.1401~~.)
- (3) Is a fuse or circuit breaker (of a rating appropriate to the cable used) installed? (FAR ~~25.1357~~.)
- (4) If a circuit breaker is used, is it of a type which will open the circuit irrespective of the position of the control, in case of a fault? (FAR ~~25.1357~~)

c. Operating Aspects:

- (1) Does the system illuminate in all directions within 30° above and 30° below ~~the~~ horizontal plane of the aircraft, except for a solid angle obstructed visibility not exceeding **0.03 steradians** in the rearward direction? (FAR ~~25.1401~~) A relatively simple method to determine the solid angle obstruction due to the tail fin is as follows:

- (a) Position the **levelled** aircraft in a darkened hangar so that its longitudinal axis is perpendicular to the hangar wall. Place a small light at the desired top anticollision light location. Measure the areas of the tail fin shadow on the wall above the height of the lamp. This area, divided by the square of the distance 'from lamp to wall (~~on~~ the same units)) is approximately equal to the solid angle obstruction in **steradians**. The distance from lamp to wall should be as large as practicable to keep errors low.

installations involving cutting of pressurized fuselage structure or fin and rudder installations, the regional Engineering Service Representative should be contacted for assistance in the evaluation.

- (2) Will the installation affect the flutter and vibration characteristics of the aircraft? (FAR **25.629**)

NOTE: The regional Engineering Service Representative should be contacted for assistance in evaluating this installation, particularly if it involves the fin, rudder, or top of fuselage just forward of the fin.

b. Hazards to the Aircraft or its Occupants:

- (1) Are the anticollision lights so located that their output is not detrimental to the flight **crew's** vision? (FARs **25.773** and **25.1401**)

NOTE: A night-flight check should be performed to determine that there are no hazardous reflections from such sources as the propeller discs, nacelles or wing surfaces.

- (2) Are the anticollision lights so located that they do not detract from the **conspicuity** of the position lights? (FAR **25.1401.**)
- (3) Is a fuse or circuit breaker (of a rating appropriate to the cable used) installed? (FAR **25.1357.**)
- (4) If a circuit breaker is used, is it of a type which will open the circuit irrespective of the position of the control, in case of a fault? (FAR **25.1357**)

c. Operating Aspects:

- (1) Does the system illuminate in all directions within 30° above and 30° below **the** horizontal plane of the aircraft, except for a solid angle obstructed visibility not exceeding **0.03 steradians** in the rearward direction? (FAR **25.1401**) A relatively simple method to determine the solid angle obstruction due to the tail fin is as follows:

- (a) Position the **levelled** aircraft in a darkened hangar so that its longitudinal axis is perpendicular to the hangar wall. Place a small light at the desired top anticollision light location. Measure the areas of the tail fin shadow on the wall above the height of the lamp. This area, divided by the square of the distance 'from lamp to wall ~~on~~ the same units)) is approximately equal to the solid angle obstruction in **steradians**. The distance from lamp to wall should be as large as practicable to keep errors low.

In conducting the static test, the following procedure may be used:

- 1 Determine the ~~weight~~ and center of gravity position of the complete assembly to be tested.
- 2 Mount the unit either in its position in the airplane or in a rig simulating the actual installation in the airplane.
- 3 Dummy equipment items simulating the actual buffet units should be installed utilizing the attaching points by which the equipment is normally held in place. ~~The dummy~~ equipment should be such that the required loads can be applied at the ~~cog.~~ position of the actual equipment.
- 4 The required loads should then be applied by any suitable means.

In accordance with FAR ~~23.561~~, ~~all items~~ of mass which would be apt to injure the passengers or crew in the event of a minor crash landing should have their supporting structure designed to the crash load requirements of (FAR ~~23.561~~) insofar as the forward, upward, and ~~sideward~~ direction are concerned. The applicable downward load factor shall be the critical flight or landing load factor specified in FAR ~~23.337~~, ~~23.341~~, and ~~23.473~~. In lieu of a calculated determination of the down load factor, the ultimate factors of ~~6.6~~, ~~6.6~~, and ~~9.0~~ may be used for the normal, utility, and acrobatic categories, respectively. For equipment locations not covered by FAR ~~23.561~~, the required ~~Loads~~ (ref. FAR ~~23.301~~) are the flight and landing load factors of ~~FARs 23.337~~, ~~23.341~~, and ~~23.473~~. In lieu of a calculated ~~determination~~ of these loads, the load factors of ~~23.561~~ plus the down load factors referenced above may be used.

- (2) Is the buffet or cabinet installed so that it does not adversely affect other structure, either primary or secondary? (FAR ~~23.1431~~.)
- (3) If the buffet or cabinet is installed in a compartment which has a placarded weight limitation, has this placard been changed to reflect the weight of the added equipment? (FAR ~~23.1557~~.)

In conducting the static test, the following procedure may be used:

- 1 Determine the ~~weight~~ and center of gravity position of the complete assembly to be tested.
- 2 Mount the unit either in its position in the airplane or in a rig simulating the actual installation in the airplane.
- 3 Dummy equipment items simulating the actual buffet units should be installed utilizing the attaching points by which the equipment is normally held in place. ~~The dummy~~ equipment should be such that the required loads can be applied at the ~~cog.~~ position of the actual equipment.
- 4 The required loads should then be applied by any suitable means.

In accordance with FAR ~~23.561~~, ~~all items~~ of mass which would be apt to injure the passengers or crew in the event of a minor crash landing should have ~~their~~ supporting structure designed to the crash load requirements of ! (FAR ~~23.561~~) insofar as the forward, upward, and ~~sideward~~ direction are concerned. The applicable downward load factor shall be the critical flight or landing load factor specified in FAR ~~23.337~~, ~~23.341~~, and ~~23.473~~. In lieu of a calculated determination of the down load factor, the ultimate factors of ~~6.6~~, ~~6.6~~, and ~~9.0~~ may be used for the normal, utility, and acrobatic categories, respectively. For equipment locations not covered by FAR ~~23.561~~, the required ~~Loads~~ (ref. FAR ~~23.301~~) are the flight and landing load factors of ~~FARs 23.337~~, ~~23.341~~, and ~~23.473~~. In lieu of a calculated determination of these loads, the load factors of ~~23.561~~ plus the down load factors referenced above may be used.

- (2) Is the buffet or cabinet installed so that it does not adversely affect other structure, either primary or secondary? (FAR ~~23.1431~~.)
- (3) ~~If~~ the buffet or cabinet is installed in a compartment which has a placarded weight limitation, has this placard been changed to reflect the weight of the added equipment? (FAR ~~23.1557~~.)

In conducting the static test, the following procedure may be used:

- 1 Determine the **weight and** center of gravity position of the complete assembly to be tested.
- 2 Mount the unit either in its position in the airplane or in a rig simulating the actual installation in the airplane.
- 3 Dummy equipment items simulating the actual buffet units should be installed utilizing the attaching points by which the equipment is normally held in place. The dummy equipment should be such that the required loads can be applied at the **cog.** position of the actual equipment.
- 4 The required loads should then be applied by any suitable means.

In accordance with FAR **23.561**, **all items of** mass which would be apt to injure the passengers or crew in the event of a minor crash landing should have **their** supporting structure designed to the crash load requirements of (FAR **23.561**) insofar as the **forward**, upward, and **sideward** direction are concerned. The applicable downward load factor shall be the critical flight or landing **load factor** specified in FAR **23.337**, **23.341**, and **23.473**. In lieu of a calculated determination of the down load factor, the ultimate factors of **6.6**, **6.6**, and **9.0** may be **used for** the normal, utility, and acrobatic categories, respectively. For equipment locations not covered by FAR **23.561**, the required loads (ref. FAR **23.301**) are the flight and landing load factors of **FARs 23.337**, **23.341**, and **23.473**. In lieu of a calculated determination of these loads, **the** load factors of **23.561** plus the down load factors referenced above may be used.

- (2) Is the buffet or cabinet installed so that it does not adversely affect other structure, either primary or secondary? (FAR **23.1431**.)
- (3) If the buffet or cabinet is installed in a compartment which has a placarded weight limitation, has this placard been changed to reflect the weight of the added equipment? (FAR **23.1557**.)

In conducting the static test, the following procedure may be used:

- 1 Determine the **weight and** center of gravity position of the complete assembly to be tested.
- 2 Mount the unit either in its position in the airplane or in a rig simulating the actual installation in the airplane.
- 3 Dummy equipment items simulating the actual buffet units should be installed utilizing the attaching points by which the equipment is normally held in place. **The dummy** equipment should be such that the required loads can be applied at the **cog.** position of the actual equipment.
- 4 The required loads should then be applied by any suitable means.

In accordance with FAR **23.561**, **all items of** mass which would be apt to injure the passengers or crew in the event of a minor crash landing should have **their** supporting structure designed to the crash load requirements of (FAR **23.561**) insofar as the **forward**, upward, and **sideward** direction are concerned. The applicable downward load factor shall be the critical flight or landing **load factor** specified in FAR **23.337**, **23.341**, and **23.473**. In lieu of a calculated determination of the down load factor, the ultimate factors of **6.6**, **6.6**, and **9.0** may be **used for** the normal, utility, and acrobatic categories, respectively. For equipment locations not covered by FAR **23.561**, the required loads (ref. FAR **23.301**) are the flight and landing load factors of **FARs 23.337**, **23.341**, and **23.473**. In lieu of a calculated determination of these loads, **the** load factors of **23.561** plus the down load factors referenced above may be used.

- (2) Is the buffet or cabinet installed so that it does not adversely affect other structure, either primary or secondary? (FAR **23.1431**.)
- (3) If the buffet or cabinet is installed in a compartment which has a placarded weight limitation, has this placard been changed to reflect the weight of the added equipment? (FAR **23.1557**.)

In conducting the static test, the following procedure may be used:

- 1 Determine the **weight and** center of gravity position of the complete assembly to be tested.
- 2 Mount the unit either in its position in the airplane or in a rig simulating the actual installation in the airplane.
- 3 Dummy equipment items simulating the actual buffet units should be installed utilizing the attaching points by which the equipment is normally held in place. **The dummy** equipment should be such that the required loads can be applied at the **cog.** position of the actual equipment.
- 4 The required loads should then be applied by any suitable means.

In accordance with FAR **23.561**, **all items of** mass which would be apt to injure the passengers or crew in the event of a minor crash landing should have **their** supporting structure designed to the crash load requirements of (FAR **23.561**) insofar as the **forward**, upward, and **sideward** direction are concerned. The applicable downward load factor shall be the critical flight or landing **load factor** specified in FAR **23.337**, **23.341**, and **23.473**. In lieu of a calculated determination of the down load factor, the ultimate factors of **6.6**, **6.6**, and **9.0** may be **used for** the normal, utility, and acrobatic categories, respectively. For equipment locations not covered by FAR **23.561**, the required loads (ref. FAR **23.301**) are the flight and landing load factors of **FARs 23.337**, **23.341**, and **23.473**. In lieu of a calculated determination of these loads, **the** load factors of **23.561** plus the down load factors referenced above may be used.

- (2) Is the buffet or cabinet installed so that it does not adversely affect other structure, either primary or secondary? (FAR **23.1431**.)
- (3) If the buffet or cabinet is installed in a compartment which has a placarded weight limitation, has this placard been changed to reflect the weight of the added equipment? (FAR **23.1557**.)

In conducting the static test, the following procedure may be used:

- 1 Determine the **weight and** center of gravity position of the complete assembly to be tested.
- 2 Mount the unit either in its position in the airplane or in a rig simulating the actual installation in the airplane.
- 3 Dummy equipment items simulating the actual buffet units should be installed utilizing the attaching points by which the equipment is normally held in place. The dummy equipment should be such that the required loads can be applied at the **cog.** position of the actual equipment.
- 4 The required loads should then be applied by any suitable means.

In accordance with FAR **23.561**, **all items of** mass which would be apt to injure the passengers or crew in the event of a minor crash landing should have **their** supporting structure designed to the crash load requirements of (FAR **23.561**) insofar as the **forward**, upward, and **sideward** direction are concerned. The applicable downward load factor shall be the critical flight or landing **load factor** specified in FAR **23.337**, **23.341**, and **23.473**. In lieu of a calculated determination of the down load factor, the ultimate factors of **6.6**, **6.6**, and **9.0** may be **used for** the normal, utility, and acrobatic categories, respectively. For equipment locations not covered by FAR **23.561**, the required loads (ref. FAR **23.301**) are the flight and landing load factors of **FARs 23.337**, **23.341**, and **23.473**. In lieu of a calculated determination of these loads, **the** load factors of **23.561** plus the down load factors referenced above may be used.

- (2) Is the buffet or cabinet installed so that it does not adversely affect other structure, either primary or secondary? (FAR **23.1431**.)
- (3) If the buffet or cabinet is installed in a compartment which has a placarded weight limitation, has this placard been changed to reflect the weight of the added equipment? (FAR **23.1557**.)

In conducting the static test, the following procedure may be used:

- 1 Determine the **weight and** center of gravity position of the complete assembly to be tested.
- 2 Mount the unit either in its position in the airplane or in a rig simulating the actual installation in the airplane.
- 3 Dummy equipment items simulating the actual buffet units should be installed utilizing the attaching points by which the equipment is normally held in place. The dummy equipment should be such that the required loads can be applied at the **cog.** position of the actual equipment.
- 4 The required loads should then be applied by any suitable means.

In accordance with FAR **23.561**, ~~all items of~~ mass which would be apt to injure the passengers or crew in the event of a minor crash landing should have **their** supporting structure designed to the crash load requirements of (FAR **23.561**) insofar as the **forward**, upward, and **sideward** direction are concerned. The applicable downward load factor shall be the critical flight or landing **load factor** specified in FAR **23.337**, **23.341**, and **23.473**. In lieu of a calculated determination of the down load factor, the ultimate factors of **6.6**, **6.6**, and **9.0** may be **used for** the normal, utility, and acrobatic categories, respectively. For equipment locations not covered by FAR **23.561**, the required loads (ref. FAR **23.301**) are the flight and landing load factors of **FARs 23.337**, **23.341**, and **23.473**. In lieu of a calculated determination of these loads, **the** load factors of **23.561** plus the down load factors referenced above may be used.

- (2) Is the buffet or cabinet installed so that it does not adversely affect other structure, either primary or secondary? (FAR **23.1431**.)
- (3) If the buffet or cabinet is installed in a compartment which has a placarded weight limitation, has this placard been changed to reflect the weight of the added equipment? (FAR **23.1557**.)

~~AIRWORTHINESS~~ COMPLIANCE CHECK SHEET #22

1. SUBJECT: Installations or Modifications of Windshields With or Without
. Electrical Heating Provisions in Nonpressurized Aircraft (FAR 23)

2. INTRODUCTION: These guidelines are applicable to windshields in non-pressurized airplanes. Windshield installations which are the same as those made by the airframe manufacturer or other installations on the same type aircraft which are already approved may be accepted without further investigation. If ~~the~~ installation involves modification of the basic aircraft structure, (e.g., acrylic plastic replaced with polyester or plastic ~~replaced~~ by glass or glass replaced by plastic'), a change in material thickness or method of mounting, then extreme caution should be used in the evaluation. Hidden details may affect such installations to a considerable extent, such as the method of containing the glass or ~~plastic~~.

3. APPLICABLE FEDERAL AVIATION REGULATIONS

23.301 Loads
23.307 Proof of Structure
23.321 Flight Loads
23.347 Flight Loads
23.471 Ground Loads
23.603 Materials and Workmanship
23.605 Fabrication Methods
23.607 Standard Fastenings
23.613 Material Strength Properties and Design Values
23.773 Vision
23.775 Windshields, Windows, and Canopies
23.777 Cockpit Controls
23.1351 Installation

Electric Power Sources

23.1357 Protective Devices Installation

Spare Fuses

23.1361 Master Switch Arrangement

23.1367 Switches

Switch Installation

4. CHECKLIST

a. Structural Requirements:

~~AIRWORTHINESS~~ COMPLIANCE CHECK SHEET #22

1. SUBJECT: Installations or Modifications of Windshields With or Without
. Electrical Heating Provisions in Nonpressurized Aircraft (FAR 23)

2. INTRODUCTION: These guidelines are applicable to windshields in non-pressurized airplanes. Windshield installations which are the same as those made by the airframe manufacturer or other installations on the same type aircraft which are already approved may be accepted without further investigation. If the installation involves modification of the basic aircraft structure, (e.g., acrylic plastic replaced with polyester or plastic replaced by ~~glass or~~ glass replaced" by plastic'), a change in material thickness or method of mounting, then extreme caution should be used in the evaluation. Hidden details may affect such installations to a considerable extent, such as the method of containing the glass or ~~plastic~~.

3. APPLICABLE FEDERAL AVIATION REGULATIONS

23.301 Loads
23.307 Proof of Structure
23.321 Flight Loads
23.347 Flight Loads
23.471 Ground Loads
23.603 Materials and Workmanship
23.605 Fabrication Methods
23.607 Standard Fastenings
23.613 Material Strength Properties and Design Values
23.773 Vision
23.775 Windshields, Windows, and Canopies
23.777 Cockpit Controls
23.1351 Installation

Electric Power Sources

23.1357 Protective Devices Installation

Spare Fuses

23.1361 Master Switch Arrangement

23.1367 Switches

Switch Installation

4. CHECKLIST

a. Structural Requirements:

~~AIRWORTHINESS~~ COMPLIANCE CHECK SHEET #22

1. SUBJECT: Installations or Modifications of Windshields With or Without
. Electrical Heating Provisions in Nonpressurized Aircraft (FAR 23)

2. INTRODUCTION: These guidelines are applicable to windshields in non-pressurized airplanes. Windshield installations which are the same as those made by the airframe manufacturer or other installations on the same type aircraft which are already approved may be accepted without further investigation. If the installation involves modification of the basic aircraft structure, (e.g., acrylic plastic replaced with polyester or plastic replaced by ~~glass~~ or glass replaced by plastic'), a change in material thickness or method of mounting, then extreme caution should be used in the evaluation. Hidden details may affect such installations to a considerable extent, such as the method of containing the glass or ~~plastic~~.

3. APPLICABLE FEDERAL AVIATION REGULATIONS

23.301 Loads
23.307 Proof of Structure
23.321 Flight Loads
23.347 Flight Loads
23.471 Ground Loads
23.603 Materials and Workmanship
23.605 Fabrication Methods
23.607 Standard Fastenings
23.613 Material Strength Properties and Design Values
23.773 Vision
23.775 Windshields, Windows, and Canopies
23.777 Cockpit Controls
23.1351 Installation

Electric Power Sources

23.1357 Protective Devices Installation

Spare Fuses

23.1361 Master Switch Arrangement

23.1367 Switches

Switch Installation

4. CHECKLIST

a. Structural Requirements:

~~AIRWORTHINESS~~ COMPLIANCE CHECK SHEET #22

1. SUBJECT: Installations or Modifications of Windshields With or Without
. Electrical Heating Provisions in Nonpressurized Aircraft (FAR 23)

2. INTRODUCTION: These guidelines are applicable to windshields in non-pressurized airplanes. Windshield installations which are the same as those made by the airframe manufacturer or other installations on the same type aircraft which are already approved may be accepted without further investigation. If the installation involves modification of the basic aircraft structure, (e.g., acrylic plastic replaced with polyester or plastic replaced by ~~glass or~~ glass replaced" by plastic'), a change in material thickness or method of mounting, then extreme caution should be used in the evaluation. Hidden details may affect such installations to a considerable extent, such as the method of containing the glass or ~~plastic~~.

3. APPLICABLE FEDERAL AVIATION REGULATIONS

23.301 Loads
23.307 Proof of Structure
23.321 Flight Loads
23.347 Flight Loads
23.471 Ground Loads
23.603 Materials and Workmanship
23.605 Fabrication Methods
23.607 Standard Fastenings
23.613 Material Strength Properties and Design Values
23.773 Vision
23.775 Windshields, Windows, and Canopies
23.777 Cockpit Controls
23.1351 Installation

Electric Power Sources

23.1357 Protective Devices Installation

Spare Fuses

23.1361 Master Switch Arrangement

23.1367 Switches

Switch Installation

4. CHECKLIST

a. Structural Requirements:

AIRWORTHINESS COMPLIANCE CHECK SHEET #23

1. SUBJECT: Modification of an Exhaust **Type** Cabin Heater to Increase Heat Output Without any Changes to the Existing Exhaust System - FAR 23 Aircraft.

2. APPLICABLE FEDERAL AVIATION REGULATIONS

23.1125 Exhaust Heat Exchangers, Exhaust Heat Exchangers Used in Ventilating Air Heating Systems

23.1141 Powerplant Controls

23.831 Ventilation

The type of heater under consideration is a simple muff type assembly which encloses a portion of the exhaust manifold. Since the change being evaluated does not involve any modification of the exhaust manifold, these guidelines do not cover exhaust system changes. Inspector should refer to pertinent **ACCS** if exhaust system changes are involved.

3. CHECKLIST

a. Structural:

- (1) Is the heater assembly constructed and supported to withstand vibration, inertia, and other loads which might be imposed during normal operation? (FAR **23.1125**)

b. Hazards:

- (1) Are the design and construction features of the heater such as to prevent the leakage of exhaust gases from joints or discharge **points into** the ventilating air? (FAR **23.1125**)
- (2) Is the ventilating air intake so located as to prevent the entrance of fumes or fluids from any source? (FAR **23.1125**)

NOTE: **Watch** out for areas where breathers, drains or exhaust discharge.

c. Operational:

- (1) Do the heater controls maintain their setting with the engine running? (FAR **23.1141**)
- (2) Do controls have adequate strength and rigidity to withstand operational loads? (FAR **23.1141**)

AIRWORTHINESS COMPLIANCE CHECK SHEET #23

1. SUBJECT: Modification of an Exhaust **Type** Cabin Heater to Increase Heat Output Without any Changes to the Existing Exhaust System - FAR 23 Aircraft.

2. APPLICABLE FEDERAL AVIATION REGULATIONS

23.1125 Exhaust Heat Exchangers, Exhaust Heat Exchangers Used in Ventilating Air Heating Systems

23.1141 Powerplant Controls

23.831 Ventilation

The type of heater under consideration is a simple muff type assembly which encloses a portion of the exhaust manifold. Since the change being evaluated does not involve any modification of the exhaust manifold, these guidelines do not cover exhaust system changes. Inspector should refer to pertinent **ACCS** if exhaust system changes are involved.

3. CHECKLIST

a. Structural:

- (1) Is the heater assembly constructed and supported to withstand vibration, inertia, and other loads which might be imposed during normal operation? (FAR **23.1125**)

b. Hazards:

- (1) Are the design and construction features of the heater such as to prevent the leakage of exhaust gases from joints or discharge **points into** the ventilating air? (FAR **23.1125**)
- (2) Is the ventilating air intake so located as to prevent the entrance of fumes or fluids from any source? (FAR **23.1125**)

NOTE: **Watch** out for areas where breathers, drains or exhaust discharge.

c. Operational:

- (1) Do the heater controls maintain their setting with the engine running? (FAR **23.1141**)
- (2) Do controls have adequate strength and rigidity to withstand operational loads? (FAR **23.1141**)

AIRWORTHINESS COMPLIANCE CHECK SHEET #23

1. SUBJECT: Modification of an Exhaust **Type** Cabin Heater to Increase Heat Output Without any Changes to the Existing Exhaust System - FAR 23 Aircraft.

2. APPLICABLE FEDERAL AVIATION REGULATIONS

23.1125 Exhaust Heat Exchangers, Exhaust Heat Exchangers Used in Ventilating Air Heating Systems
23.1141 Powerplant Controls
23.831 Ventilation

The type of heater under consideration is a simple muff type assembly which encloses a portion of the exhaust manifold. Since the change being evaluated does not involve any modification of the exhaust manifold, these guidelines do not cover exhaust system changes. Inspector should refer to pertinent **ACCS** if exhaust system changes are involved.

3. CHECKLIST

a. Structural:

- (1) Is the heater assembly constructed and supported to withstand vibration, inertia, and other loads which might be imposed during normal operation? (FAR **23.1125**)

b. Hazards:

- (1) Are the design and construction features of the heater such as to prevent the leakage of exhaust gases from joints or discharge **points into** the ventilating air? (FAR **23.1125**)
(2) Is the ventilating air intake so located as to prevent the entrance of fumes or fluids from any source? (FAR **23.1125**)

NOTE: **Watch** out for areas where breathers, drains or exhaust discharge.

c. Operational:

- (1) Do the heater controls maintain their setting with the engine running? (FAR **23.1141**)
(2) Do controls have adequate strength and rigidity to withstand operational loads? (FAR **23.1141**)

AIRWORTHINESS COMPLIANCE CHECK SHEET #23

1. SUBJECT: Modification of an Exhaust **Type** Cabin Heater to Increase Heat Output Without any Changes to the Existing Exhaust System - FAR 23 Aircraft.

2. APPLICABLE FEDERAL AVIATION REGULATIONS

23.1125 Exhaust Heat Exchangers, Exhaust Heat Exchangers Used in Ventilating Air Heating Systems
23.1141 Powerplant Controls
23.831 Ventilation

The type of heater under consideration is a simple muff type assembly which encloses a portion of the exhaust manifold. Since the change being evaluated does not involve any modification of the exhaust manifold, these guidelines do not cover exhaust system changes. Inspector should refer to pertinent **ACCS** if exhaust system changes are involved.

3. CHECKLIST

a. Structural:

- (1) Is the heater assembly constructed and supported to withstand vibration, inertia, and other loads which might be imposed during normal operation? (FAR **23.1125**)

b. Hazards:

- (1) Are the design and construction features of the heater such as to prevent the leakage of exhaust gases from joints or discharge **points into** the ventilating air? (FAR **23.1125**)
(2) Is the ventilating air intake so located as to prevent the entrance of fumes or fluids from any source? (FAR **23.1125**)

NOTE: **Watch** out for areas where breathers, drains or exhaust discharge.

c. Operational:

- (1) Do the heater controls maintain their setting with the engine running? (FAR **23.1141**)
(2) Do controls have adequate strength and rigidity to withstand operational loads? (FAR **23.1141**)

AIRWORTHINESS COMPLIANCE CHECK SHEET #24

1. SUBJECT:: 'Buffet Installation (Electrical Portion) - FAR 23 Aircraft

2. APPLICABLE FEDERAL AVIATION REGULATIONS

23.1351 Electrical System Installations

Generator

23.1357 Fuses or Circuit Breakers

23.1361 Master Switch Arrangement

23.1365 Electric Cables

3. CHECKLIST

a. Structural Requirements:

None (See ACCS on Buffet Installations)

b. Hazards to the Aircraft or its Occupants:

(1) Is a fuse or circuit breaker, of appropriate rating to protect the cable, installed in the circuits to the buffet? (FAR 23.1357.)

(2) If a circuit breaker is used, is it of a type which will open the circuit irrespective of the position of the control in case of a fault? (FAR 23.1357.)

(3) Are the connecting cables to the buffet in accordance with recognized standards for electric cable of a slow-burning type? (Cable conforming to military specification MIL-W-5086 or the equivalent is acceptable.) (FAR 23.1365.)

c. Operating Aspects:

None

d. Detail Design Standards:

(1) Are the electric cables to the buffet installed in such a manner that they are suitably protected from fuel, oil, water (including probable drippings from the buffet itself), and other mechanical damage? (FAR 23.1351.)

(2) Is the circuit to the buffet connected through the master switch arrangement? (FAR 23.1361.)

(3) Output ratings should be compared to maximum probable loads per AC 43.13-1, paragraph 238. (FAR 23.1351)

AIRWORTHINESS COMPLIANCE CHECK SHEET #24

1. SUBJECT:: 'Buffet Installation (Electrical Portion) - FAR 23 Aircraft

2. APPLICABLE FEDERAL AVIATION REGULATIONS

23.1351 Electrical System Installations

Generator

23.1357 Fuses or Circuit Breakers

23.1361 Master Switch Arrangement

23.1365 Electric Cables

3. CHECKLIST

a. Structural Requirements:

None (See **ACCS** on Buffet Installations)

b. Hazards to the Aircraft or its Occupants:

(1) Is a fuse or circuit breaker, of appropriate rating to protect the cable, installed in the circuits to the buffet? (FAR 23.1357.)

(2) If a circuit breaker is **used**, is it of a type which will open the circuit irrespective of the position of the control in case of a fault? (FAR 23.1357.)

(3) Are the connecting cables to the buffet in accordance with recognized standards for electric cable of a slow-burning type? (Cable conforming to military specification **MIL-W-5086** or the equivalent is acceptable.) (FAR 23.1365.)

c. Operating Aspects:

None

d. Detail Design Standards:

(1) Are the electric cables to the buffet installed in such a manner that they are suitably protected from fuel, oil, water (including probable drippings from the buffet itself), and other mechanical damage? (FAR 23.1351.)

(2) Is the circuit to the buffet connected through the master switch arrangement? (FAR 23.1361.)

(3) Output ratings should be compared to maximum probable loads per AC 43.13-1, paragraph 238. (FAR 23.1351)

AIRWORTHINESS COMPLIANCE CHECK SHEET #24

1. SUBJECT:: 'Buffet Installation (Electrical Portion) - FAR 23 Aircraft

2. APPLICABLE FEDERAL AVIATION REGULATIONS

23.1351 Electrical System Installations

Generator

23.1357 Fuses or Circuit Breakers

23.1361 Master Switch Arrangement

23.1365 Electric Cables

3. CHECKLIST

a. Structural Requirements:

None (See ACCS on Buffet Installations)

b. Hazards to the Aircraft or its Occupants:

(1) Is a fuse or circuit breaker, of appropriate rating to protect the cable, installed in the circuits to the buffet? (FAR 23.1357.)

(2) If a circuit breaker is used, is it of a type which will open the circuit irrespective of the position of the control in case of a fault? (FAR 23.1357.)

(3) Are the connecting cables to the buffet in accordance with recognized standards for electric cable of a slow-burning type? (Cable conforming to military specification MIL-W-5086 or the equivalent is acceptable.) (FAR 23.1365.)

c. Operating Aspects:

None

d. Detail Design Standards:

(1) Are the electric cables to the buffet installed in such a manner that they are suitably protected from fuel, oil, water (including probable drippings from the buffet itself), and other mechanical damage? (FAR 23.1351.)

(2) Is the circuit to the buffet connected through the master switch arrangement? (FAR 23.1361.)

(3) Output ratings should be compared to maximum probable loads per AC 43.13-1, paragraph 238. (FAR 23.1351)

AIRWORTHINESS COMPLIANCE CHECK SHEET #24

1. SUBJECT:: 'Buffet Installation (Electrical Portion) - FAR 23 Aircraft

2. APPLICABLE FEDERAL AVIATION REGULATIONS

23.1351 Electrical System Installations

Generator

23.1357 Fuses or Circuit Breakers

23.1361 Master Switch Arrangement

23.1365 Electric Cables

3. CHECKLIST

a. Structural Requirements:

None (See ACCS on Buffet Installations)

b. Hazards to the Aircraft or its Occupants:

(1) Is a fuse or circuit breaker, of appropriate rating to protect the cable, installed in the circuits to the buffet? (FAR 23.1357.)

(2) If a circuit breaker is used, is it of a type which will open the circuit irrespective of the position of the control in case of a fault? (FAR 23.1357.)

(3) Are the connecting cables to the buffet in accordance with recognized standards for electric cable of a slow-burning type? (Cable conforming to military specification MIL-W-5086 or the equivalent is acceptable.) (FAR 23.1365.)

c. Operating Aspects:

None

d. Detail Design Standards:

(1) Are the electric cables to the buffet installed in such a manner that they are suitably protected from fuel, oil, water (including probable drippings from the buffet itself), and other mechanical damage? (FAR 23.1351.)

(2) Is the circuit to the buffet connected through the master switch arrangement? (FAR 23.1361.)

(3) Output ratings should be compared to maximum probable loads per AC 43.13-1, paragraph 238. (FAR 23.1351)

AIRWORTHINESS COMPLIANCE CHECK SHEET #24

1. SUBJECT:: 'Buffet Installation (Electrical Portion) - FAR 23 Aircraft

2. APPLICABLE FEDERAL AVIATION REGULATIONS

23.1351 Electrical System Installations

Generator

23.1357 Fuses or Circuit Breakers

23.1361 Master Switch Arrangement

23.1365 Electric Cables

3. CHECKLIST

a. Structural Requirements:

None (See ACCS on Buffet Installations)

b. Hazards to the Aircraft or its Occupants:

(1) Is a fuse or circuit breaker, of appropriate rating to protect the cable, installed in the circuits to the buffet? (FAR 23.1357.)

(2) If a circuit breaker is used, is it of a type which will open the circuit irrespective of the position of the control in case of a fault? (FAR 23.1357.)

(3) Are the connecting cables to the buffet in accordance with recognized standards for electric cable of a slow-burning type? (Cable conforming to military specification MIL-W-5086 or the equivalent is acceptable.) (FAR 23.1365.)

c. Operating Aspects:

None

d. Detail Design Standards:

(1) Are the electric cables to the buffet installed in such a manner that they are suitably protected from fuel, oil, water (including probable drippings from the buffet itself), and other mechanical damage? (FAR 23.1351.)

(2) Is the circuit to the buffet connected through the master switch arrangement? (FAR 23.1361.)

(3) Output ratings should be compared to maximum probable loads per AC 43.13-1, paragraph 238. (FAR 23.1351)

- (3) Are junction boxes of sufficiently rigid construction to prevent "oil-canning" of the sides to avoid possibility of inside shorting? (~~FARs~~ 25.301, 25.305, 25.1309)
- (4) Is the structure of the radio rack adequate to support the required loads? The effect on other structure (either primary or secondary) should be considered. (~~FARs~~ 25.301, 25.303, 25.307, 25.321, 25.471 and 25.561)

This answer can be determined by either of two methods:

- (a) By direct comparison with an existing approved installation having the same or similar (approximately the same weight, size, and arrangement) equipment installed.
- (b) By structural analysis or static test. Such installations do not necessarily lend themselves to analysis but are adaptable to static test. In conducting the test, the following procedure may be used?

- 1 Determine the wt. and c.g. position of the equipment item.
- 2 Mount the rack either in its position in the airplane or in a rig simulating the actual installation insofar as attachments to the airplane are concerned.
- 3 Dummy equipment or a rig simulating the equipment items should be installed utilizing the attaching points to which the equipment is to be attached. The dummy equipment or rig should be so that the required loads can be applied at the c.g. position of the actual equipment.
- 4 The required loads should then be applied by any suitable means.

All items of mass which would be apt to injure the passengers or crew in the event of a crash landing should have their supporting structure designed to the crash load requirements of FAR 25.561 or the applicable critical flight or landing load factors of ~~FARs~~ 25.321, whichever is greater. (~~FARs~~ 25.321 and 25.471)

Supporting structure of other mass items should be designed to the critical flight or landing load factors of ~~FARs~~ 25.321, 25.471. The values shown in FAR 25.561 may be used in lieu of a determination of these values.

- (3) Are junction boxes of sufficiently rigid construction to prevent "oil-canning" of the sides to avoid possibility of inside shorting? (~~FARs~~ 25.301, 25.305, 25.1309)
- (4) Is the structure of the radio rack adequate to support the required loads? The effect on other structure (either primary or secondary) should be considered. (~~FARs~~ 25.301, 25.303, 25.307, 25.321, 25.471 and 25.561)

This answer can be determined by either of two methods:

- (a) By direct comparison with an existing approved installation having the same or similar (approximately the same weight, size, and arrangement) equipment installed.
- (b) By structural analysis or static test. Such installations do not necessarily lend themselves to analysis but are adaptable to static test. In conducting the test, the following procedure may be used?

- 1 Determine the wt. and c.g. position of the equipment item.
- 2 Mount the rack either in its position in the airplane or in a rig simulating the actual installation insofar as attachments to the airplane are concerned.
- 3 Dummy equipment or a rig simulating the equipment items should be installed utilizing the attaching points to which the equipment is to be attached. The dummy equipment or rig should be so that the required loads can be applied at the c.g. position of the actual equipment.
- 4 The required loads should then be applied by any suitable means.

All items of mass which would be apt to injure the passengers or crew in the event of a crash landing should have their supporting structure designed to the crash load requirements of FAR 25.561 or the applicable critical flight or landing load factors of ~~FARs~~ 25.321, whichever is greater. (~~FARs~~ 25.321 and 25.471)

Supporting structure of other mass items should be designed to the critical flight or landing load factors of ~~FARs~~ 25.321, 25.471. The values shown in FAR 25.561 may be used in lieu of a determination of these values.

- (3) Are junction boxes of sufficiently rigid construction to prevent "oil-canning" of the sides to avoid possibility of inside shorting? (~~FARs~~ 25.301, 25.305, 25.1309)
- (4) Is the structure of the radio rack adequate to support the required loads? The effect on other structure (either primary or secondary) should be considered. (~~FARs~~ 25.301, 25.303, 25.307, 25.321, 25.471 and 25.561)

This answer can be determined by either of two methods:

- (a) By direct comparison with an existing approved installation having the same or similar (approximately the same weight, size, and arrangement) equipment installed.
- (b) By structural analysis or static test. Such installations do not necessarily lend themselves to analysis but are adaptable to static test. In conducting the test, the following procedure may be used?

- 1 Determine the wt. and c.g. position of the equipment item.
- 2 Mount the rack either in its position in the airplane or in a rig simulating the actual installation insofar as attachments to the airplane are concerned.
- 3 Dummy equipment or a rig simulating the equipment items should be installed utilizing the attaching points to which the equipment is to be attached. The dummy equipment or rig should be so that the required loads can be applied at the c.g. position of the actual equipment.
- 4 The required loads should then be applied by any suitable means.

All items of mass which would be apt to injure the passengers or crew in the event of a crash landing should have their supporting structure designed to the crash load requirements of FAR 25.561 or the applicable critical flight or landing load factors of ~~FARs~~ 25.321, whichever is greater. (~~FARs~~ 25.321 and 25.471)

Supporting structure of other mass items should be designed to the critical flight or landing load factors of ~~FARs~~ 25.321, 25.471. The values shown in FAR 25.561 may be used in lieu of a determination of these values.

- (3) Are junction boxes of sufficiently rigid construction to prevent "oil-canning" of the sides to avoid possibility of inside shorting? (~~FARs~~ 25.301, 25.305, 25.1309)
- (4) Is the structure of the radio rack adequate to support the required loads? The effect on other structure (either primary or secondary) should be considered. (~~FARs~~ 25.301, 25.303, 25.307, 25.321, 25.471 and 25.561)

This answer can be determined by either of two methods:

- (a) By direct comparison with an existing approved installation having the same or similar (approximately the same weight, size, and arrangement) equipment installed.
- (b) By structural analysis or static test. Such installations do not necessarily lend themselves to analysis but are adaptable to static test. In conducting the test, the following procedure may be used?

- 1 Determine the wt. and c.g. position of the equipment item.
- 2 Mount the rack either in its position in the airplane or in a rig simulating the actual installation insofar as attachments to the airplane are concerned.
- 3 Dummy equipment or a rig simulating the equipment items should be installed utilizing the attaching points to which the equipment is to be attached. The dummy equipment or rig should be so that the required loads can be applied at the c.g. position of the actual equipment.
- 4 The required loads should then be applied by any suitable means.

All items of mass which would be apt to injure the passengers or crew in the event of a crash landing should have their supporting structure designed to the crash load requirements of FAR 25.561 or the applicable critical flight or landing load factors of ~~FARs~~ 25.321, whichever is greater. (~~FARs~~ 25.321 and 25.471)

Supporting structure of other mass items should be designed to the critical flight or landing load factors of ~~FARs~~ 25.321, 25.471. The values shown in FAR 25.561 may be used in lieu of a determination of these values.

- (2) Will the installation affect the flutter and vibration characteristics of the aircraft?. (**FARs 25.251,** and **25.629.**)

NOTE : The regional Engineering Service Representative should be contacted for assistance in this evaluation, particularly for those installations involving the fin, rudder, or top of the fuselage just forward of the fin.

b. Hazards to the Aircraft or its Occupants:

- (1) Is the antenna mounted so as not to obstruct instrument pitot and static source areas? (**FARs 25.1309,** **25.1323,** **25.1325,** **25.1327,** **25.1329,** and **25.1331.**)
- (2) Is the attachment of the antenna adequate to prevent its dislodgment with possible damage to airplane surfaces? (**FAR 25.1309.**)
- (3) Is the antenna installed so that it does not adversely affect other structure (either primary or secondary) or cause interference with any controls, emergency exits, or necessary access provisions? (**FAR 25.1309.**)

c. Operating Aspects:

- (1) Have the necessary operational tests been performed to assure that the equipment will not adversely affect the operation of other communication or navigation systems? (**FARs 25.1301,** and **25.1309.**)

d. Detail Design Standards:

None

- (2) Will the installation affect the flutter and vibration characteristics of the aircraft?. (~~FARs 25.251,~~ and ~~25.629.~~)

NOTE : The regional Engineering Service Representative should be contacted for assistance in this evaluation, particularly for those installations involving the fin, rudder, or top of the fuselage just forward of the fin.

b. Hazards to the Aircraft or its Occupants:

- (1) Is the antenna mounted so as not to obstruct instrument ~~pitot~~ and static source areas? (~~FARs 25.1309,~~ ~~25.1323,~~ ~~25.1325,~~ ~~25.1327,~~ ~~25.1329,~~ and ~~25.1331.~~)
- (2) Is the attachment of the antenna adequate to prevent its ~~dislodg-~~
~~ment~~ with possible damage to airplane surfaces? (FAR ~~25.1309.~~)
- (3) Is the antenna installed so that it does not adversely affect other structure (either primary or secondary) or cause interference with any controls, emergency exits, or necessary access provisions? (FAR ~~25.1309.~~)

c. Operating Aspects:

- (1) Have the necessary operational tests been performed to assure that the equipment will not adversely affect the operation of other communication or navigation systems? (~~FARs 25.1301,~~ and ~~25.1309.~~)

d. Detail Design Standards:

None

- (2) Will the installation affect the flutter and vibration characteristics of the aircraft?. (~~FARs 25.251,~~ and ~~25.629.~~)

NOTE : The regional Engineering Service Representative should be contacted for assistance in this evaluation, particularly for those installations involving the fin, ~~rudder,~~ or top of the fuselage just forward of the fin,

b. Hazards to the Aircraft or its Occupants:

- (1) Is the antenna mounted so as not to obstruct instrument ~~pitot~~ and static source areas? (~~FARs 25.1309, 25.1323, 25.1325, 25.1327, 25.1329,~~ and ~~25.1331.~~)
- (2) Is the attachment of the antenna adequate to prevent its ~~dislodg-~~
~~ment~~ with possible damage to airplane surfaces? (~~FAR 25.1309.~~)
- (3) Is the antenna installed so that it does not adversely affect other structure (either primary or secondary) or cause interference with any controls, emergency exits, or necessary access provisions? (~~FAR 25.1309.~~)

c. Operating Aspects:

- (1) Have the necessary operational tests been performed to assure that the equipment will not adversely affect the operation of other communication or navigation systems? (~~FARs 25.1301,~~ and ~~25.1309.~~)

d. Detail Design Standards:

None

AIRWORTHINESS COMPLIANCE CHECK SHEET #29

1. SUBJECT: Instrument Installations - Relocating Instruments, FAR 23 Aircraft

2. APPLICABLE FEDERAL AVIATION REGULATIONS

~~23.301~~ Loads

~~23.993~~ Fuel System Lines, Fittings, and Accessories

~~23.1301~~ Functional and Installational Requirements

~~23.1321~~ Arrangement and Visibility of Instrument Installations
Instrument Panel Vibration Characteristics

~~23.1327~~ Magnetic Direction Indicator

~~23.1337~~ Instrument Lines

Fuel Quantity Indicator

Cylinder Head Temperature Indicating System for Air-Cooled Engines

~~23.1547~~ Magnetic Direction Indicator

Relocated instrument installations which are the same as those made by the airframe manufacturer or other installations which are already approved, may be **accepted** without further investigation. On other accepted installations, the following points should be checked to determine that the installation is satisfactory.

3. CHECKLIST

- a. Structural Requirements:

- (1) If holes are added to the instrument panel, is the structural integrity of the panel or its supporting structure impaired? (FAR 23.301.)

NOTE: This may normally be determined by a visual check. If the panel or its supporting structure is an integral part of the airplane structure, caution should be used in the evaluation.

- b. Hazards to the Aircraft or its Occupants:

- (1) If powerplant instruments ~~are relocated~~, are their lines (which carry inflammable fluids and gases under **pressure**) **provided** with restricted orifices or other safety devices at the source of pressure to prevent excessive escape of fluid or gas in case of line failure? (FAR ~~23.1337~~.)

AIRWORTHINESS COMPLIANCE CHECK SHEET #29

1. SUBJECT: Instrument Installations - Relocating Instruments, FAR 23 Aircraft

2. APPLICABLE FEDERAL AVIATION REGULATIONS

~~23.301~~ Loads

~~23.993~~ Fuel System Lines, Fittings, and Accessories

~~23.1301~~ Functional and Installational Requirements

~~23.1321~~ Arrangement and Visibility of Instrument Installations
Instrument Panel Vibration Characteristics

~~23.1327~~ Magnetic Direction Indicator

~~23.1337~~ Instrument Lines

Fuel Quantity Indicator

Cylinder Head Temperature Indicating System for Air-Cooled Engines

~~23.1547~~ Magnetic Direction Indicator

Relocated instrument installations which are the same as those made by the airframe manufacturer or other installations which are already approved, may be **accepted** without further investigation. On other accepted installations, the following points should be checked to determine that the installation is satisfactory.

3. CHECKLIST

a. Structural Requirements:

(1) If holes are added to the instrument panel, is the structural integrity of the panel or its supporting structure impaired? (FAR **23.301.**)

NOTE: This may normally be determined by a visual check. If the panel or its supporting structure is an integral part of the airplane structure, caution should be used in the evaluation.

b. Hazards to the Aircraft or its Occupants:

(1) If powerplant instruments ~~are relocated~~, are their **lines (which carry inflammable fluids and gases under pressure) provided** with restricted orifices or other safety devices at the source of pressure to prevent excessive escape of fluid or gas in case of line failure? (FAR **23.1337e.**)

AIRWORTHINESS COMPLIANCE CHECK SHEET #29

1. SUBJECT: Instrument Installations - Relocating Instruments, FAR 23 Aircraft

2. APPLICABLE FEDERAL AVIATION REGULATIONS

~~23.301~~ Loads

~~23.993~~ Fuel System Lines, Fittings, and Accessories

~~23.1301~~ Functional and Installational Requirements

~~23.1321~~ Arrangement and Visibility of Instrument Installations
Instrument Panel Vibration Characteristics

~~23.1327~~ Magnetic Direction Indicator

~~23.1337~~ Instrument Lines

Fuel Quantity Indicator

Cylinder Head Temperature Indicating System for Air-Cooled Engines

~~23.1547~~ Magnetic Direction Indicator

Relocated instrument installations which are the same as those made by the airframe manufacturer or other installations which are already approved, may be **accepted** without further investigation. On other accepted installations, the following points should be checked to determine that the installation is satisfactory.

3. CHECKLIST

a. Structural Requirements:

- (1) If holes are added to the instrument panel, is the structural integrity of the panel or its supporting structure impaired? (FAR 23.301.)

NOTE: This may normally be determined by a visual check. If the panel or its supporting structure is an integral part of the airplane structure, caution should be used in the evaluation.

b. Hazards to the Aircraft or its Occupants:

- (1) If powerplant instruments are ~~relocated~~, are their lines (which carry inflammable fluids and gases under pressure) ~~provided~~ with restricted orifices or other safety devices at the source of pressure to prevent excessive escape of fluid or gas in case of line failure? (FAR ~~23.1337a~~)

AIRWORTHINESS COMPLIANCE CHECK SHEET #29

1. SUBJECT: Instrument Installations - Relocating Instruments, FAR 23 Aircraft

2. APPLICABLE FEDERAL AVIATION REGULATIONS

~~23.301~~ Loads
~~23.993~~ Fuel System Lines, Fittings, and Accessories
~~23.1301~~ Functional and Installational Requirements
~~23.1321~~ Arrangement and Visibility of Instrument Installations
Instrument Panel Vibration Characteristics
~~23.1327~~ Magnetic Direction Indicator
~~23.1337~~ Instrument Lines

Fuel Quantity Indicator
Cylinder Head Temperature Indicating System for Air-Cooled Engines

~~23.1547~~ Magnetic Direction Indicator

Relocated instrument installations which are the same as those made by the airframe manufacturer or other installations which are already approved, may be **accepted** without further investigation. On other accepted installations, the following points should be checked to determine that the installation is satisfactory.

3. CHECKLIST

a. Structural Requirements:

- (1) If holes are added to the instrument panel, is the structural integrity of the panel or its supporting structure impaired? (FAR 23.301.)

NOTE: This may normally be determined by a visual check. If the panel or its supporting structure is an integral part of the airplane structure, caution should be used in the evaluation.

b. Hazards to the Aircraft or its Occupants:

- (1) If powerplant instruments are ~~relocated~~, are their lines (which carry inflammable fluids and gases under pressure) ~~provided~~ with restricted orifices or other safety devices at the source of pressure to prevent excessive escape of fluid or gas in case of line failure? (FAR ~~23.1337a~~)

AIRWORTHINESS COMPLIANCE CHECK SHEET #30

le SUBJECT: Instrument Installations - Adding Instruments, FAR 23 Aircraft

2. APPLICABLE FEDERAL AVIATION REGULATIONS

~~23.301~~ Loads

Instruments and Markings

~~23.1301~~ Functional and Installational Requirements - Equipment

~~23.1321~~ Arrangement and Visibility of Instrument Installations

Instrument Panel Vibration Characteristics

~~23.1327~~ Magnetic Direction Indicator

~~23.1337~~ Instrument Lines

Fuel Quantity Indicator

Cylinder Head Temperature Indicating System for Air-Cooled
Engines

~~23.1543~~ Instrument Markings

~~23.1547~~ Magnetic Direction Indicator

~~23.1555~~ Accessory and Auxiliary Controls

Added instrument installations which are the same as those made by the airframe manufacturer or other installations which are already approved, may be accepted without further investigation, On other installations, the following points should be checked to determine that the installation is satisfactory,

3. CHECKLIST

ae Structural Requirements:

- (1) If ~~holes~~ are added to instrument panel, is the structural integrity of the panel or its supporting structure impaired?
(FAR ~~23,301.~~)

NOTE: This may normally be determined by a visual check. If the panel or its supporting structure is an integral part of the airplane structure, caution should be used in the evaluation.

b. Hazards to the Aircraft or its Occupants:

- (1) If powerplant instruments are added, are their lines which carry inflammable fluids and gases under pressure provided with

AIRWORTHINESS COMPLIANCE CHECK SHEET #30

1. SUBJECT: Instrument Installations - Adding Instruments, FAR 23 Aircraft

2. APPLICABLE FEDERAL AVIATION REGULATIONS

~~23.301~~ Loads

Instruments and Markings

~~23.1301~~ Functional and Installational Requirements - Equipment

~~23.1321~~ Arrangement and Visibility of Instrument Installations

Instrument Panel Vibration Characteristics

~~23.1327~~ Magnetic Direction Indicator

~~23.1337~~ Instrument Lines

Fuel Quantity Indicator

Cylinder Head Temperature Indicating System for Air-Cooled Engines

~~23.1543~~ Instrument Markings

~~23.1547~~ Magnetic Direction Indicator

~~23.1555~~ Accessory and Auxiliary Controls

Added instrument installations which are the same as those made by the airframe manufacturer or other installations which are already approved, may be accepted without further ~~investigation~~. On other installations, the following points should be checked to determine that the installation is satisfactory.

3. CHECKLIST

a. Structural Requirements:

- (1) If. holes are added to instrument panel, is the structural integrity of the panel or its supporting structure impaired?
(FAR ~~23.301~~.)

NOTE: This may normally be determined by a visual check. If the panel or its supporting structure is an integral part of the airplane structure, caution should be used in the evaluation.

b. Hazards to the Aircraft or its Occupants:

- (1) If powerplant instruments are added, are their lines which carry inflammable fluids **and gases** under pressure provided with

AIRWORTHINESS COMPLIANCE CHECK SHEET #30

1. SUBJECT: Instrument Installations - Adding Instruments, FAR 23 Aircraft

2. APPLICABLE FEDERAL AVIATION REGULATIONS

~~23.301~~ Loads

Instruments and Markings

~~23.1301~~ Functional and Installational Requirements - Equipment

~~23.1321~~ Arrangement and Visibility of Instrument Installations

Instrument Panel Vibration Characteristics

~~23.1327~~ Magnetic Direction Indicator

~~23.1337~~ Instrument Lines

Fuel Quantity Indicator

Cylinder Head Temperature Indicating System for Air-Cooled Engines

~~23.1543~~ Instrument Markings

~~23.1547~~ Magnetic Direction Indicator

~~23.1555~~ Accessory and Auxiliary Controls

Added instrument installations which are the same as those made by the airframe manufacturer or other installations which are already approved, may be accepted without further ~~investigation~~. On other installations, the following points should be checked to determine that the installation is satisfactory.

3. CHECKLIST

a. Structural Requirements:

- (1) If. holes are added to instrument panel, is the structural integrity of the panel or its supporting structure impaired?
(FAR ~~23.301~~.)

NOTE : This may normally be determined by a visual check. If the panel or its supporting structure is an integral part of the airplane structure, caution should be used in the evaluation.

b. Hazards to the Aircraft or its Occupants:

- (1) If powerplant instruments are added, are their lines which carry inflammable fluids **and gases** under pressure provided with

AIRWORTHINESS COMPLIANCE CHECK SHEET #30

1. SUBJECT: Instrument Installations - Adding Instruments, FAR 23 Aircraft

2. APPLICABLE FEDERAL AVIATION REGULATIONS

~~23.301~~ Loads

Instruments and Markings

~~23.1301~~ Functional and Installational Requirements - Equipment

~~23.1321~~ Arrangement and Visibility of Instrument Installations

Instrument Panel Vibration Characteristics

~~23.1327~~ Magnetic Direction Indicator

~~23.1337~~ Instrument Lines

Fuel Quantity Indicator

Cylinder Head Temperature Indicating System for Air-Cooled Engines

~~23.1543~~ Instrument Markings

~~23.1547~~ Magnetic Direction Indicator

~~23.1555~~ Accessory and Auxiliary Controls

Added instrument installations which are the same as those made by the airframe manufacturer or other installations which are already approved, may be accepted without further ~~investigation~~. On other installations, the following points should be checked to determine that the installation is satisfactory.

3. CHECKLIST

a. Structural Requirements:

- (1) If. holes are added to instrument panel, is the structural integrity of the panel or its supporting structure impaired?
(FAR ~~23.301~~.)

NOTE: This may normally be determined by a visual check. If the panel or its supporting structure is an integral part of the airplane structure, caution should be used in the evaluation.

b. Hazards to the Aircraft or its Occupants:

- (1) If powerplant instruments are added, are their lines which carry inflammable fluids **and gases** under pressure provided with

AIRWORTHINESS COMPLIANCE CHECK SHEET #30

1. SUBJECT: Instrument Installations - Adding Instruments, FAR 23 Aircraft

2. APPLICABLE FEDERAL AVIATION REGULATIONS

~~23.301~~ Loads

Instruments and Markings

~~23.1301~~ Functional and Installational Requirements - Equipment

~~23.1321~~ Arrangement and Visibility of Instrument Installations

Instrument Panel Vibration Characteristics

~~23.1327~~ Magnetic Direction Indicator

~~23.1337~~ Instrument Lines

Fuel Quantity Indicator

Cylinder Head Temperature Indicating System for Air-Cooled
Engines

~~23.1543~~ Instrument Markings

~~23.1547~~ Magnetic Direction Indicator

~~23.1555~~ Accessory and Auxiliary Controls

Added instrument installations which are the same as those made by the airframe manufacturer or other installations which are already approved, may be accepted without further ~~investigation~~. On other installations, the following points should be checked to determine that the installation is satisfactory.

3. CHECKLIST

a. Structural Requirements:

- (1) If. holes are added to instrument panel, is the structural integrity of the panel or its supporting structure impaired?
(FAR ~~23.301~~.)

NOTE: This may normally be determined by a visual check. If the panel or its supporting structure is an integral part of the airplane structure, caution should be used in the evaluation.

b. Hazards to the Aircraft or its Occupants:

- (1) If powerplant instruments are added, are their lines which carry inflammable fluids **and gases** under pressure provided with

AIRWORTHINESS COMPLIANCE CHECK SHEET **#30**

1. SUBJECT: Instrument Installations - Adding Instruments, FAR **23** Aircraft

2. APPLICABLE FEDERAL AVIATION REGULATIONS

~~23.301~~ Loads

Instruments and Markings

~~23.1301~~ Functional and Installational Requirements - Equipment

~~23.1321~~ Arrangement and Visibility of Instrument Installations

Instrument Panel Vibration Characteristics

~~23.1327~~ Magnetic Direction Indicator

~~23.1337~~ Instrument Lines

Fuel Quantity Indicator

Cylinder Head Temperature Indicating System for Air-Cooled Engines

~~23.1543~~ Instrument Markings

~~23.1547~~ Magnetic Direction Indicator

~~23.1555~~ Accessory and Auxiliary Controls

Added instrument installations which are the same as those made by the airframe manufacturer or other installations which are already approved, may be accepted without further **investigation**. On other installations, the following points should be checked to determine that the installation is **satisfactory**.

3. CHECKLIST

a. Structural Requirements:

- (1) If. holes are added to instrument panel, is the structural integrity of the panel or its supporting structure impaired?
(FAR **23.301**.)

NOTE : This may normally be determined by a visual check. If the panel or its supporting structure is an integral part of the airplane structure, caution **should** be used in the evaluation.

b. Hazards to the Aircraft or its Occupants:

- (1) If powerplant instruments are added, are their lines which carry inflammable fluids **and gases** under pressure provided with

AIRWORTHINESS COMPLIANCE CHECK SHEET #32

1. SUBJECT: Instrument Installations - Adding Instrument, FAR 25 Aircraft

2. APPLICABLE FEDERAL AVIATION REGULATIONS

- 25.301 Loads
- 25.1301 Functional and Installation Requirements - Equipment
- 25.1309 Equipment, Systems, and Installations
- 25.1321 Arrangement and Visibility of Instrument Installations
- 25.1323 Flight and Navigation Instruments
- 25.1325 Flight and Navigation Instruments
- 25.1327 Flight and Navigation Instruments
- 25.1329 Flight and Navigation Instruments
- 25.1331 Flight and Navigation Instruments
- 25.1337 Powerplant Instruments
- 25.1433 Vacuum Systems
- 25.1541 Markings and Placards
- 25.1543 Instrument Markings
- 25.1545 Air Speed Indicator
- 25.1547 Magnetic Direction Indicator
- 25.1549 Powerplant Instruments
- 25.1551 Oil Quantity Indicator
- 25.1553 Fuel Quantity Indicator

3. CHECKLIST

a. Structural Requirements:

- (1) 'If holes are added to instrument panel, is the structural integrity of the panel or its supporting structure impaired? (FAR 25.301.)

NOTE: This may normally be determined by a visual check. If the panel or its supporting structure is an integral part of the airplane structure, caution should be used in the evaluation.

b. Hazards to the Aircraft or its Occupants:

- (1) If powerplant instruments are added, are their lines which carry inflammable fluids and gases under pressure provided with restricted orifices or other safety devices at the source of pressure to prevent excessive escape of fluid or gas in case of line failure? (FARs 25.993, and 25.1337.)

c. Operating Aspects:

- (1) Are added flight, navigation and powerplant instruments installed

AIRWORTHINESS COMPLIANCE CHECK SHEET #32

1. SUBJECT: Instrument Installations - Adding Instrument, FAR 25 Aircraft

2. APPLICABLE FEDERAL AVIATION REGULATIONS

25.301 Loads
25.1301 Functional and Installation Requirements - Equipment
25.1309 Equipment, Systems, and Installations
25.1321 Arrangement and Visibility of Instrument Installations
25.1323 Flight and Navigation Instruments
25.1325 Flight and Navigation Instruments
25.1327 Flight and Navigation Instruments
25.1329 Flight and Navigation Instruments
25.1331 Flight and Navigation Instruments
25.1337 Powerplant Instruments
25.1433 Vacuum Systems
25.1541 Markings and Placards
25.1543 Instrument Markings
25.1545 Air Speed Indicator
25.1547 Magnetic Direction Indicator
25.1549 Powerplant Instruments
25.1551 Oil Quantity Indicator
25.1553 Fuel Quantity Indicator

3. CHECKLIST

a. Structural Requirements:

(1) 'If holes are added to instrument panel, is the structural integrity of the panel or its supporting structure impaired? (FAR 25.301.)

NOTE: This may normally be determined by a visual check. If the panel or its supporting structure is an integral part of the airplane structure, caution should be used in the evaluation.

b. Hazards to the Aircraft or its Occupants:

(1) If powerplant instruments are added, are their lines which carry inflammable fluids and gases under pressure provided with restricted orifices or other safety devices at the source of pressure to prevent excessive escape of fluid or gas in case of line failure? (FARs 25.993, and 25.1337.)

c. Operating Aspects:

(1) Are added flight, navigation and powerplant instruments installed

AIRWORTHINESS COMPLIANCE CHECK SHEET #32

1. SUBJECT: Instrument Installations - Adding Instrument, FAR 25 Aircraft

2. APPLICABLE FEDERAL AVIATION REGULATIONS

- 25.301 Loads
- 25.1301 Functional and Installation Requirements - Equipment
- 25.1309 Equipment, Systems, and Installations
- 25.1321 Arrangement and Visibility of Instrument Installations
- 25.1323 Flight and Navigation Instruments
- 25.1325 Flight and Navigation Instruments
- 25.1327 Flight and Navigation Instruments
- 25.1329 Flight and Navigation Instruments
- 25.1331 Flight and Navigation Instruments
- 25.1337 Powerplant Instruments
- 25.1433 Vacuum Systems
- 25.1541 Markings and Placards
- 25.1543 Instrument Markings
- 25.1545 Air Speed Indicator
- 25.1547 Magnetic Direction Indicator
- 25.1549 Powerplant Instruments
- 25.1551 Oil Quantity Indicator
- 25.1553 Fuel Quantity Indicator

3. CHECKLIST

a. Structural Requirements:

- (1) 'If holes are added to instrument panel, is the structural integrity of the panel or its supporting structure impaired? (FAR 25.301.)

NOTE: This may normally be determined by a visual check. If the panel or its supporting structure is an integral part of the airplane structure, caution should be used in the evaluation.

b. Hazards to the Aircraft or its Occupants:

- (1) If powerplant instruments are added, are their lines which carry inflammable fluids and gases under pressure provided with restricted orifices or other safety devices at the source of pressure to prevent excessive escape of fluid or gas in case of line failure? (FARs 25.993, and 25.1337.)

c. Operating Aspects:

- (1) Are added flight, navigation and powerplant instruments installed

- (2) Is an indicating means provided which will indicate that the instruments are receiving adequate suction for their required performance? (FAR **23.1331.**)
- (3) If the airplane is multiengine, does the suction air system provide satisfactory protection, in case of line breakage or leakage to an instrument, so as not to impair the performance of the other instruments? (FAR **23.1331.**)
- (4) Is the electrical power supply of adequate capacity to operate all of the electrically operated gyro instruments installed? (FAR **23.1331.**)
- (5) Does the power failure warning indication provide adequate warning to indicate when proper power is not being received by the instruments? (FAR **23.1331.**)
- (6) If the airplane is multiengine, are two completely independent power sources provided which are actuated by separate means? (FAR **23.1331.**)
- (7) If the airplane is multiengine, is the power source circuitry such as not to impair the operation of the instruments should breakage of an electrical conductor to an instrument occur? (FAR **23.1331.**)
- (8) If the airplane is multiengine, is a positive means provided for selecting either power source? (FAR **23.1331.**)
- (9) If the airplane is multiengine, is a means provided for indicating the power source output? (FAR **23.1331.**)
- (10) Are the **gyroscopic** instruments and their systems installed to preclude malfunctioning due to rain, oil, and other detrimental elements? (FAR **23.1331.**)
- (11) If an engine-driven suction air pump(s) is installed, is it compatible with the engine mounting pad and drive provided for such pumps? (FAR **23.1301.**)
- (12) If an engine-driven suction air pump(s) is installed, are flexible type pump connector lines provided? (FAR **23.1301.**)
- (13) Are the shock absorbing characteristics of the instrument panel satisfactory after adding equipment? (FAR **23.1321.**)

- (2) Is an indicating means ~~provided~~ which will indicate that the instruments are receiving adequate suction for their required performance? (FAR ~~23.1331.~~)
- (3) If the airplane is multiengine, does the suction air system provide satisfactory protection, in case of line breakage or leakage to an instrument, so as not to impair the ~~performance~~ of the other instruments? (FAR ~~23.1331.~~)
- (4) Is the electrical power supply of adequate capacity to operate all of the electrically operated gyro instruments installed? (FAR ~~23.1331.~~)
- (5) Does the power failure warning indication provide adequate warning to indicate when proper power is not being received by the instruments? (FAR ~~23.1331.~~)
- (6) If the airplane is multiengine, are two completely independent power sources provided which are actuated by separate means? (FAR ~~23.1331.~~)
- (7) If the airplane is multiengine, is the power ~~source~~ circuitry such as not to impair the operation of the instruments should breakage of an electrical conductor to an instrument occur? (FAR ~~23.1331.~~)
- (8) If the airplane is multiengine, is a positive means provided for selecting either power source? (FAR ~~23.1331.~~)
- (9) If the airplane is multiengine, is a means provided for indicating the power source output? (FAR ~~23.1331.~~)
- (10) Are the ~~gyroscopic~~ instruments and their systems installed to preclude malfunctioning due to rain, oil, and other detrimental elements? (FAR ~~23.1331.~~)
- (11) If an engine-driven suction air pump(s) is installed, is it compatible with the engine mounting pad and drive provided for such pumps? (FAR ~~23.1301.~~)
- (12) If an engine-driven suction air pump(s) is installed, are flexible type pump connector lines provided? (FAR ~~23.1301.~~)
- (13) Are the shock absorbing characteristics of the instrument panel satisfactory after adding equipment? (FAR ~~23.1321.~~)

- (2) Is an indicating means provided which will indicate that the instruments are receiving adequate suction for their required performance? (FAR **23.1331.**)
- (3) If the airplane is multiengine, does the suction air system provide satisfactory protection, in case of line breakage or leakage to an instrument, so as not to impair the ~~performance~~ of the other instruments? (FAR **23.1331.**)
- (4) Is the electrical power supply of adequate capacity to operate all of the electrically operated gyro instruments installed? (FAR **23.1331.**)
- (5) Does the power failure warning indication provide adequate warning to indicate when proper power is not being received by the instruments? (FAR **23.1331.**)
- (6) If the airplane is multiengine, are two completely independent power sources provided which are actuated by separate means? (FAR **23.1331.**)
- (7) If the airplane is multiengine, is the power **source** circuitry such as not to impair the operation of the instruments should breakage of an electrical conductor to an instrument occur? (FAR **23.1331.**)
- (8) If the airplane is multiengine, is a positive means provided for selecting either power source? (FAR **23.1331.**)
- (9) If the airplane is multiengine, is a means provided for indicating the power source output? (FAR **23.1331.**)
- (10) Are the **gyroscopic** instruments and their systems installed to preclude malfunctioning due to rain, oil, and other detrimental elements? (FAR **23.1331.**)
- (11) If an engine-driven suction air pump(s) is installed, is it compatible with the engine mounting pad and drive provided for such pumps? (FAR **23.1301.**)
- (12) If an engine-driven suction air pump(s) is installed, are flexible type pump connector lines provided? (FAR **23.1301.**)
- (13) Are the shock absorbing characteristics of the instrument panel satisfactory after adding equipment? (FAR **23.1321.**)

- (2) Is an indicating means provided which will indicate that the instruments are receiving adequate suction for their required performance? (FAR **23.1331.**)
- (3) If the airplane is multiengine, does the suction air system provide satisfactory protection, in case of line breakage or leakage to an instrument, so as not to impair the ~~performance~~ of the other instruments? (FAR **23.1331.**)
- (4) Is the electrical power supply of adequate capacity to operate all of the electrically operated gyro instruments installed? (FAR **23.1331.**)
- (5) Does the power failure warning indication provide adequate warning to indicate when proper power is not being received by the instruments? (FAR **23.1331.**)
- (6) If the airplane is multiengine, are two completely independent power sources provided which are actuated by separate means? (FAR **23.1331.**)
- (7) If the airplane is multiengine, is the power **source** circuitry such as not to impair the operation of the instruments should breakage of an electrical conductor to an instrument occur? (FAR **23.1331.**)
- (8) If the airplane is multiengine, is a positive means provided for selecting either power source? (FAR **23.1331.**)
- (9) If the airplane is multiengine, is a means provided for indicating the power source output? (FAR **23.1331.**)
- (10) Are the **gyroscopic** instruments and their systems installed to preclude malfunctioning due to rain, oil, and other detrimental elements? (FAR **23.1331.**)
- (11) If an engine-driven suction air pump(s) is installed, is it compatible with the engine mounting pad and drive provided for such pumps? (FAR **23.1301.**)
- (12) If an engine-driven suction air pump(s) is installed, are flexible type pump connector lines provided? (FAR **23.1301.**)
- (13) Are the shock absorbing characteristics of the instrument panel satisfactory after adding equipment? (FAR **23.1321.**)

- (2) Is an indicating means provided which will indicate that the instruments are receiving adequate suction for their required performance? (FAR **23.1331.**)
- (3) If the airplane is multiengine, does the suction air system provide satisfactory protection, in case of line breakage or leakage to an instrument, so as not to impair the ~~performance~~ of the other instruments? (FAR **23.1331.**)
- (4) Is the electrical power supply of adequate capacity to operate all of the electrically operated gyro instruments installed? (FAR **23.1331.**)
- (5) Does the power failure warning indication provide adequate warning to indicate when proper power is not being received by the instruments? (FAR **23.1331.**)
- (6) If the airplane is multiengine, are two completely independent power sources provided which are actuated by separate means? (FAR **23.1331.**)
- (7) If the airplane is multiengine, is the power **source** circuitry such as not to impair the operation of the instruments should breakage of an electrical conductor to an instrument occur? (FAR **23.1331.**)
- (8) If the airplane is multiengine, is a positive means provided for selecting either power source? (FAR **23.1331.**)
- (9) If the airplane is multiengine, is a means provided for indicating the power source output? (FAR **23.1331.**)
- (10) Are the **gyroscopic** instruments and their systems installed to preclude malfunctioning due to rain, oil, and other detrimental elements? (FAR **23.1331.**)
- (11) If an engine-driven suction air pump(s) is installed, is it compatible with the engine mounting pad and drive provided for such pumps? (FAR **23.1301.**)
- (12) If an engine-driven suction air pump(s) is installed, are flexible type pump connector lines provided? (FAR **23.1301.**)
- (13) Are the shock absorbing characteristics of the instrument panel satisfactory after adding equipment? (FAR **23.1321.**)

AIRWORTHINESS COMPLIANCE CHECK SHEET #35

1. SUBJECT: Installation of Liquid Nitrogen Air Conditioners.

2. APPLICABLE REGULATIONS.

a. Federal Aviation Regulations, Part 23

21.1(b)	Applicability
21.16	Special conditions
21.21	Issue of T.C. ; normal, utility, etc.
21.303	Replacement or modifications parts
21.305	Approval of materials, parts, processes, etc.
23.21	Proof of compliance
23.23	Local distribution limits
23.301	Loads
23.303	Factor of safety
23.305	Strength and deformation
23.307	Proof of structure
23.561	Emergency landing conditions
23.603	Materials and workmanship
23.605	Fabrication methods
23.609	Protection of structure
23.611	Accessibility
23.613	Material strength properties & design values
23.777	Cockpit controls
23.787	Cargo compartments
23.1357	Circuit protective devices
23.1365	Electric cables
23.1367	Switches
23.1519	Weight & center of gravity
23.1541	General (marking & placards)
23.1555	Control markings
23.1581	Airplane Flight Manual (General)
23.1589	Loading information
43.13	Performance rules (General)

b. Civil Aeronautics Manual, Part 3

3.0	Applicability
3.18	Approval of materials, parts, processes, and appliances
3.71	Weight & balance
3.76	Center of gravity position
3.171	Loads
3.172	Factor of safety
3.173	Strength and deformations
3.174	Proof of structure
3.292	Materials and workmanship

AIRWORTHINESS COMPLIANCE CHECK SHEET #35

1. SUBJECT: Installation of Liquid Nitrogen Air Conditioners.

2. APPLICABLE REGULATIONS.

a. Federal Aviation Regulations, Part 23

21.1(b)	Applicability
21.16	Special conditions
21.21	Issue of T.C. ; normal, utility, etc.
21.303	Replacement or modifications parts
21.305	Approval of materials, parts, processes, etc.
23.21	Proof of compliance
23.23	Local distribution limits
23.301	Loads
23.303	Factor of safety
23.305	Strength and deformation
23.307	Proof of structure
23.561	Emergency landing conditions
23.603	Materials and workmanship
23.605	Fabrication methods
23.609	Protection of structure
23.611	Accessibility
23.613	Material strength properties & design values
23.777	Cockpit controls
23.787	Cargo compartments
23.1357	Circuit protective devices
23.1365	Electric cables
23.1367	Switches
23.1519	Weight & center of gravity
23.1541	General (marking & placards)
23.1555	Control markings
23.1581	Airplane Flight Manual (General)
23.1589	Loading information
43.13	Performance rules (General)

b. Civil Aeronautics Manual, Part 3

3.0	Applicability
3.18	Approval of materials, parts, processes, and appliances
3.71	Weight & balance
3.76	Center of gravity position
3.171	Loads
3.172	Factor of safety
3.173	Strength and deformations
3.174	Proof of structure
3.292	Materials and workmanship

AIRWORTHINESS COMPLIANCE CHECK SHEET #35

1. SUBJECT: Installation of Liquid Nitrogen Air Conditioners.

2. APPLICABLE REGULATIONS.

a. Federal Aviation Regulations, Part 23

21.1(b)	Applicability
21.16	Special conditions
21.21	Issue of T.C. ; normal, utility, etc.
21.303	Replacement or modifications parts
21.305	Approval of materials, parts, processes, etc.
23.21	Proof of compliance
23.23	Local distribution limits
23.301	Loads
23.303	Factor of safety
23.305	Strength and deformation
23.307	Proof of structure
23.561	Emergency landing conditions
23.603	Materials and workmanship
23.605	Fabrication methods
23.609	Protection of structure
23.611	Accessibility
23.613	Material strength properties & design values
23.777	Cockpit controls
23.787	Cargo compartments
23.1357	Circuit protective devices
23.1365	Electric cables
23.1367	Switches
23.1519	Weight & center of gravity
23.1541	General (marking & placards)
23.1555	Control markings
23.1581	Airplane Flight Manual (General)
23.1589	Loading information
43.13	Performance rules (General)

b. Civil Aeronautics Manual, Part 3

3.0	Applicability
3.18	Approval of materials, parts, processes, and appliances
3.71	Weight & balance
3.76	Center of gravity position
3.171	Loads
3.172	Factor of safety
3.173	Strength and deformations
3.174	Proof of structure
3.292	Materials and workmanship

- (d) In the event the pressure vessels are not marked as above the inspector should require proof that the components ~~meet~~ the requirements of FAR ~~43.43~~ (Reference AC 20-62A, paragraph 5 and 6)
- (2) Are the valves, ~~lines~~, fittings, and/or other hardware capable of withstanding the maximum pressures and flows the system may be subjected to? (i.e. cylinders must be limited by a pressure control valve so sized and set that the pressure can never exceed 15 PSI lower than one and one fourth (1 1/4) times the marked service pressure. (Ref. Code of Federal Regulations, Title 49-Transportation, Section 173.304(b)(2)). The working pressure of the LN₂ system is likely to be considerably below the service pressure markings on the bottle. The service pressure is the pressure up to which the vessel is considered safe to operate while the working pressure is that which the particular system may be expected to reach in normal operations.
- (3) Are the vent lines and the supply pressure vessel protected from the possibility of damage to the system by cargo or baggage placement or lading operation? (FAR 23.609, .787), (3.292, 3.292)
- (4) Are the vent lines, pressure vessel lines, etc., located and supported properly in case of a crash landing giving due consideration to occupants survival? (FAR 23.561, .603, .605, .613, .737), (3.292, .293, .301, .392)
- (5) Are the vent and burst tube discharge ends located where the escaping gas will not directly enter any cabin air or critical system intakes? (FAR 23.561, .603, .605, .613, .787), (3.292, .293, .301, .392)
- (6) Are personnel protected from contact with the lines, liquid or gaseous nitrogen? (FAR 23.561)
- (7) Are the evaporator moisture collecting pan-drain tube, burst disc-escape tube, and exhaust tube vented outside the aircraft without sharp tube bends what will restrict free flow? (FAR 23.603, .605, .609, (3.292, .293, ● 295)
- (8) Are the ends of drain and vent lines accessible so they may be inspected and/or cleaned of obstructions and are they in a nonpositive pressure area so that adequate gas escape is possible? (FAR 23.603, .609), (3.292, .293, .295)
- (9) Has the weight-and-balance effect including weight limitations been considered? Have appropriate placards and manuals been changed if necessary? (FAR 23.21, .23, .1589), (3.171, .748)

- (d) In the event the pressure vessels are not marked as above the inspector should require proof that the components ~~meet~~ the requirements of FAR ~~43.43~~ (Reference AC 20-62A, paragraph 5 and 6)
- (2) Are the valves, ~~lines~~, fittings, and/or other hardware capable of withstanding the maximum pressures and flows the ~~systems~~ may be subjected to? (i.e. cylinders ~~must~~ be limited by a pressure control valve so sized and set ~~that~~ the pressure can never exceed 15 PSI lower than one and one ~~fourth~~ (1 1/4) ~~times~~ the marked service pressure. (Ref. Code of Federal Regulations, Title ~~49-Transportation~~, Section ~~173.334(b)(2)~~). The working pressure of the LN₂ system is likely to be considerably below the service pressure markings on the ~~bottle~~. The service pressure is the pressure up to ~~which~~ the *vessel is ~~considered~~ safe to operate while the working pressure is that which ~~the~~ particular system may be expected to reach in normal operations.
- (3) Are the vent lines ~~and~~ the supply pressure vessel protected from the possibility of damage to the system by cargo or ~~baggage placement~~ or loading operation? (FAR ~~23.609, .787~~), (3.292, 3.292)
- (4) Are the vent lines, pressure vessel lines, etc., located and supported properly in case of a crash landing giving due ~~consideration~~ to occupants survival? (FAR ~~23.561, .603, .605, .613, .787~~), (3.292, 0293, 0301, 0392)
- (5) Are the vent and burst tube discharge ends located where the ~~escaping~~ gas will not directly enter any cabin air or critical system intakes? (FAR ~~23.561, .603, .605, .613, .787~~), (3.292, 0293, 0301, 0392)
- (6) Are personnel protected from contact with the lines, liquid or gaseous nitrogen? (FAR ~~23.561~~)
- (7) Are the evaporator moisture collecting pan-drain tube, burst disc-escape tube, and exhaust tube vented outside the aircraft ~~without~~ sharp tube bends what will restrict free flow? (FAR ~~23.603, .605, .609~~, (3.292, 0293, ● 295)
- (8) Are the ends of drain and vent lines accessible so they may be ~~inspected~~ and/or cleaned of obstructions and are they in a nonpositive pressure area so that adequate gas escape is possible? (FAR ~~23.603, .609~~), (3.292, 293, 295)
- (9) Has the weight-and-balance effect including weight limitations been considered? Have appropriate placards and manuals been changed if necessary? (FAR ~~23.21, .23, .1589~~), (3.171, 748)

- (d) In the event the pressure vessels are not marked as above the inspector should require proof that the components ~~meet~~ the requirements of FAR ~~43.43~~ (Reference AC 20-62A, paragraph 5 and 6)
- (2) Are the valves, ~~lines~~, fittings, and/or other hardware capable of withstanding the maximum pressures and flows the ~~systems~~ may be subjected to? (i.e. cylinders ~~must~~ be limited by a pressure control valve so sized and set ~~that~~ the pressure can never exceed 15 PSI lower than one and one ~~fourth~~ (1 1/4) ~~times~~ the marked service pressure. (Ref. Code of Federal Regulations, Title ~~49-Transportation~~, Section ~~173.304(b)(2)~~). The working pressure of the LN₂ system is likely to be considerably below the service pressure markings on the ~~bottle~~. The service pressure is the pressure up to ~~which~~ the *vessel is ~~considered~~ safe to operate while the working pressure is that which ~~the~~ particular system may be expected to reach in normal operations.
- (3) Are the vent lines ~~and~~ the supply pressure vessel protected from the possibility of damage to the system by cargo or ~~baggage placement~~ or loading operation? (FAR ~~23.609, .787~~), (3.292, 3.292)
- (4) Are the vent lines, pressure vessel lines, etc., located and supported properly in case of a crash landing giving due ~~consideration~~ to occupants survival? (FAR ~~23.561, .603, .605, .613, .787~~), (3.292, 0293, 0301, 0392)
- (5) Are the vent and burst tube discharge ends located where the ~~escaping~~ gas will not directly enter any cabin air or critical system intakes? (FAR ~~23.561, .603, .605, .613, .787~~), (3.292, 0293, 0301, 0392)
- (6) Are personnel protected from contact with the lines, liquid or gaseous nitrogen? (FAR ~~23.561~~)
- (7) Are the evaporator moisture collecting pan-drain tube, burst disc-escape tube, and exhaust tube vented outside the aircraft ~~without~~ sharp tube bends what will restrict free flow? (FAR ~~23.603, .605, .609~~, (3.292, 0293, ● 295)
- (8) Are the ends of drain and vent lines accessible so they may be ~~inspected~~ and/or cleaned of obstructions and are they in a nonpositive pressure area so that adequate gas escape is possible? (FAR ~~23.603, .609~~), (3.292, 293, 295)
- (9) Has the weight-and-balance effect including weight limitations been considered? Have appropriate placards and manuals been changed if necessary? (FAR ~~23.21, .23, .1589~~), (3.171, 748)

- (d) In the event the pressure vessels are not marked as above the inspector should require proof that the components ~~meet~~ the requirements of FAR ~~43.43~~ (Reference AC 20-62A, paragraph 5 and 6)
- (2) Are the valves, ~~lines~~, fittings, and/or other hardware capable of withstanding the maximum pressures and flows the ~~systems~~ may be subjected to? (i.e. cylinders ~~must~~ be limited by a pressure control valve so sized and set ~~that~~ the pressure can never exceed 15 PSI lower than one and one ~~fourth~~ (1 1/4) ~~times~~ the marked service pressure. (Ref. Code of Federal Regulations, Title ~~49-Transportation~~, Section ~~173.304(b)(2)~~). The working pressure of the LN₂ system is likely to be considerably below the service pressure markings on the ~~bottle~~. The service pressure is the pressure up to ~~which~~ the *vessel is ~~considered~~ safe to operate while the working pressure is that which ~~the~~ particular system may be expected to reach in normal operations.
- (3) Are the vent lines ~~and~~ the supply pressure vessel protected from the possibility of damage to the system by cargo or ~~baggage placement~~ or loading operation? (FAR ~~23.609, .787~~), (3.292, 3.292)
- (4) Are the vent lines, pressure vessel lines, etc., located and supported properly in case of a crash landing giving due ~~consideration~~ to occupants survival? (FAR ~~23.561, .603, .605, .613, .787~~), (3.292, 0293, 0301, 0392)
- (5) Are the vent and burst tube discharge ends located where the ~~escaping~~ gas will not directly enter any cabin air or critical system intakes? (FAR ~~23.561, .603, .605, .613, .787~~), (3.292, 0293, 0301, 0392)
- (6) Are personnel protected from contact with the lines, liquid or gaseous nitrogen? (FAR ~~23.561~~)
- (7) Are the evaporator moisture collecting pan-drain tube, burst disc-escape tube, and exhaust tube vented outside the aircraft ~~without~~ sharp tube bends what will restrict free flow? (FAR ~~23.603, .605, .609~~, (3.292, 0293, ● 295)
- (8) Are the ends of drain and vent lines accessible so they may be ~~inspected~~ and/or cleaned of obstructions and are they in a nonpositive pressure area so that adequate gas escape is possible? (FAR ~~23.603, .609~~), (3.292, 293, 295)
- (9) Has the weight-and-balance effect including weight limitations been considered? Have appropriate placards and manuals been changed if necessary? (FAR ~~23.21, .23, .1589~~), (3.171, 748)

- (d) In the event the pressure vessels are not marked as above the inspector should require proof that the components ~~meet~~ the requirements of FAR ~~43.43~~ (Reference AC 20-62A, paragraph 5 and 6)
- (2) Are the valves, ~~lines~~, fittings, and/or other hardware capable of withstanding the maximum pressures and flows the ~~systems~~ may be subjected to? (i.e. cylinders ~~must~~ be limited by a pressure control valve so sized and set ~~that~~ the pressure can never exceed 15 PSI lower than one and one ~~fourth~~ (1 1/4) ~~times~~ the marked service pressure. (Ref. Code of Federal Regulations, Title ~~49-Transportation~~, Section ~~173.304(b)(2)~~). The working pressure of the LN₂ system is likely to be considerably below the service pressure markings on the ~~bottle~~. The service pressure is the pressure up to ~~which~~ the *vessel is considered safe to operate while the working pressure is that which ~~the~~ particular system may be expected to reach in normal operations.
- (3) Are the vent lines ~~and~~ the supply pressure vessel protected from the possibility of damage to the system by cargo or ~~baggage placement~~ or loading operation? (FAR ~~23.609, .787~~), (3.292, 3.292)
- (4) Are the vent lines, pressure vessel lines, etc., located and supported properly in case of a crash landing giving due ~~consideration~~ to occupants survival? (FAR ~~23.561, .603, .605, .613, .787~~), (3.292, 0293, 0301, 0392)
- (5) Are the vent and burst tube discharge ends located where the ~~escaping~~ gas will not directly enter any cabin air or critical system intakes? (FAR ~~23.561, .603, .605, .613, .787~~), (3.292, 0293, 0301, 0392)
- (6) Are personnel protected from contact with the lines, liquid or gaseous nitrogen? (FAR ~~23.561~~)
- (7) Are the evaporator moisture collecting pan-drain tube, burst disc-escape tube, and exhaust tube vented outside the aircraft ~~without~~ sharp tube bends what will restrict free flow? (FAR ~~23.603, .605, .609~~, (3.292, 0293, ● 295)
- (8) Are the ends of drain and vent lines accessible so they may be ~~inspected~~ and/or cleaned of obstructions and are they in a nonpositive pressure area so that adequate gas escape is possible? (FAR ~~23.603, .609~~), (3.292, 293, 295)
- (9) Has the weight-and-balance effect including weight limitations been considered? Have appropriate placards and manuals been changed if necessary? (FAR ~~23.21, .23, .1589~~), (3.171, 748)

- (d) In the event the pressure vessels are not marked as above the inspector should require proof that the components ~~meet~~ the requirements of FAR ~~43.43~~ ~~(Reference AC 20-62A,~~ paragraph 5 and 6)
- (2) Are the valves, ~~lines~~, fittings, and/or other hardware capable of withstanding the maximum pressures and flows the ~~systems~~ may be subjected to? (i.e. cylinders ~~must~~ be limited by a pressure control valve so sized and set ~~that~~ the pressure can never exceed 15 PSI lower than one and one ~~fourth~~ ~~(1 1/4)~~ times the marked service pressure. (Ref. Code of Federal Regulations, Title ~~49-Transportation~~, Section ~~173.334(b)(2)~~). The working pressure of the LN₂ system is likely to be considerably below the service pressure markings on the ~~bottle~~. The ~~service~~ pressure is the pressure up to ~~which~~ the *vessel is ~~considered~~ safe to operate while the working pressure is that which ~~the~~ particular system may be expected to reach in normal operations.
- (3) Are the vent lines ~~and~~ the supply pressure vessel protected from the possibility of damage to the system by cargo or ~~baggage placement~~ or loading operation? (FAR ~~23.609, .787)~~, (3.292, 3.292)
- (4) Are the vent lines, pressure vessel lines, etc., located and supported properly in case of a crash landing giving due ~~consideration~~ to occupants survival? (FAR ~~23.561, .603, .605, .613, .787)~~, (3.292, 0293, 0301, 0392)
- (5) Are ~~the~~ vent and burst tube discharge ends located where the ~~escaping~~ gas will not directly enter any cabin air or critical system intakes? (FAR ~~23.561, .603, .605, .613, .787)~~, (3.292, 0293, 0301, 0392)
- (6) Are personnel protected from contact with the lines, liquid or gaseous nitrogen? (FAR ~~23.561~~)
- (7) Are the evaporator moisture collecting pan-drain tube, burst disc-escape tube, and exhaust tube vented outside the aircraft ~~without~~ sharp tube bends what will restrict free flow? (FAR ~~23.603, .605, .609~~, (3.292, 0293, ● 295)
- (8) Are the ~~ends~~ of drain and vent lines accessible so they may be ~~inspected~~ and/or cleaned of obstructions and are they in a nonpositive pressure area so that adequate gas escape is possible? (FAR ~~23.603, .609~~, (3.292, 293, 295)
- (9) Has the weight-and-balance effect including weight limitations been considered? Have appropriate placards and manuals been changed if necessary? (FAR ~~23.21, .23, .1589~~, (3.171, 748)

- (d) In the event the pressure vessels are not marked as above the inspector should require proof that the components ~~meet~~ the requirements of FAR ~~43.43~~ (Reference AC 20-62A, paragraph 5 and 6)
- (2) Are the valves, ~~lines~~, fittings, and/or other hardware capable of withstanding the maximum pressures and flows the ~~systems~~ may be subjected to? (i.e. cylinders ~~must~~ be limited by a pressure control valve so sized and set ~~that~~ the ~~pressure~~ can never exceed 15 PSI lower than one and one ~~fourth~~ (~~1 1/4~~) ~~times~~ the marked service pressure. (Ref. Code of Federal Regulations, Title ~~49-Transportation~~, Section ~~173.304(b)(2)~~). The working pressure of the LN₂ system is likely to be considerably below the service pressure markings on the ~~bottle~~. The ~~service~~ pressure is the pressure up to ~~which~~ the *vessel is ~~considered~~ safe to operate while the working pressure is that which ~~the~~ particular system may be expected to reach in normal operations.
- (3) Are the vent lines ~~and~~ the supply pressure vessel protected ~~from the possibility~~ of damage to the system by cargo or ~~baggage placement~~ or loading operation? (FAR ~~23.609, .787~~), (3.292, 3.292)
- (4) Are the vent lines, pressure vessel lines, etc., located and ~~supported~~ properly in case of a crash landing giving due ~~consideration~~ to occupants survival? (FAR ~~23.561, .603, .605, .613, .787~~), (3.292, 0293, 0301, 0392)
- (5) Are ~~the~~ vent and burst tube discharge ends located where the ~~escaping~~ gas will not directly enter any cabin air or critical ~~system~~ intakes? (FAR ~~23.561, .603, .605, .613, .787~~), (3.292, 0293, 0301, 0392)
- (6) Are personnel protected from contact with the lines, liquid or gaseous nitrogen? (FAR ~~23.561~~)
- (7) Are the evaporator moisture collecting pan-drain tube, burst disc-escape tube, and exhaust tube vented outside the aircraft ~~without~~ sharp tube bends what will restrict free flow? (FAR ~~23.603, .605, .609~~, (3.292, 0293, ● 295)
- (8) Are the ~~ends~~ of drain and vent lines accessible so they may be ~~inspected~~ and/or cleaned of obstructions and are they in a nonpositive ~~pressure~~ area so that adequate gas escape is possible? (FAR ~~23.603, .609~~), (3.292, 293, 295)
- (9) Has the weight-and-balance effect including weight limitations been considered? Have appropriate placards and manuals been changed if necessary? (FAR ~~23.21, .23, .1589~~), (3.171, 748)